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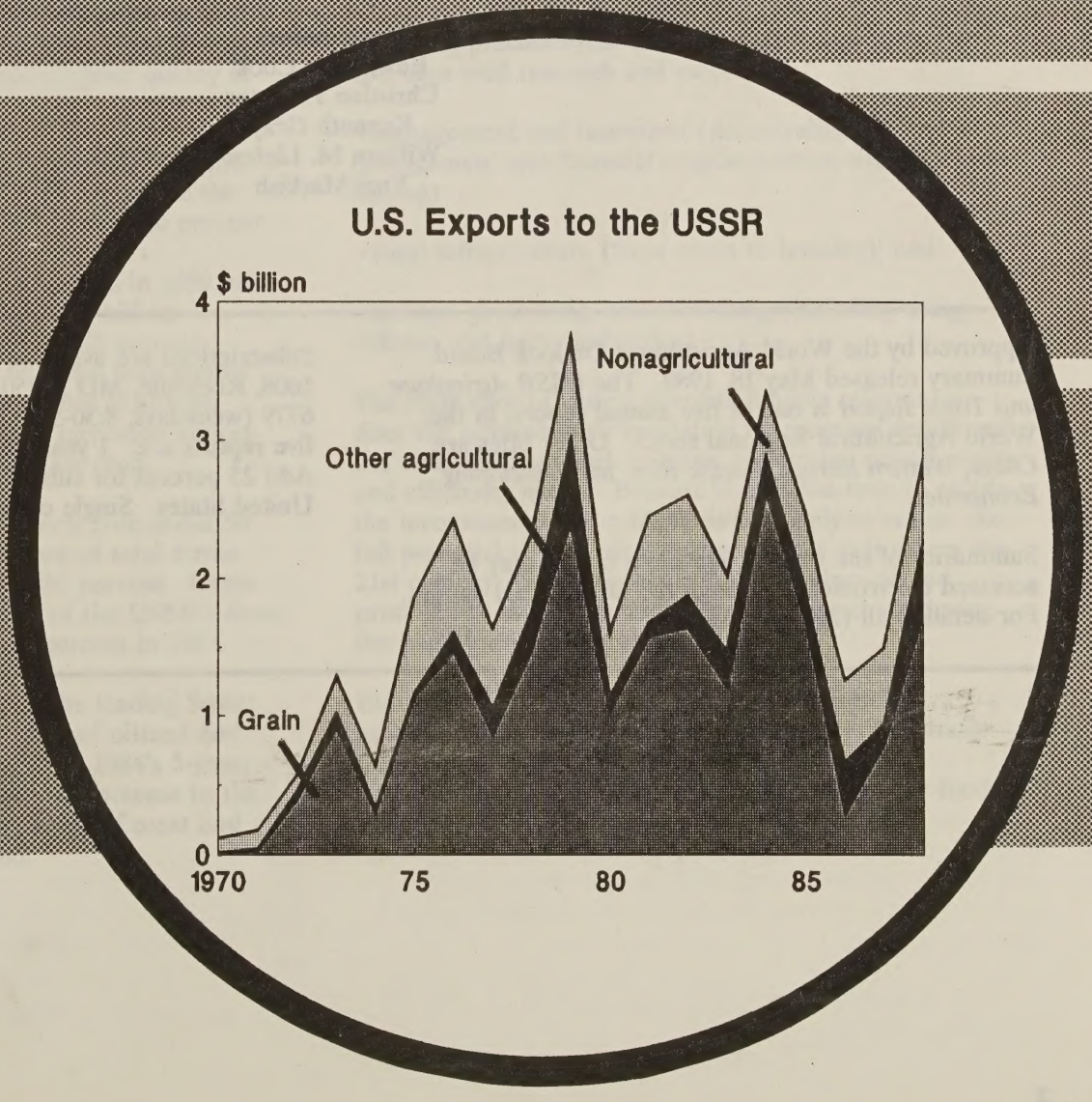

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Summary

U.S. agricultural exports to the USSR continue to recover from 1986's 13-year low and may be record-high in 1989. Substantially larger corn exports and much higher wheat prices will push exports to the USSR well above last year's $2.246 billion. Exports in 1988 were nearly 2-1/2 times 1987 and were exceeded only in 1979 and 1984.

The United States may expand its share of Soviet grain imports from about 30 percent in 1987 and 45 percent in 1988. Last year, the USSR took 12 percent of the value of all U.S. grain and feed exports, and the U.S. share of all Soviet agricultural imports was an estimated 14 percent. The USSR remained the third largest market for U.S. agricultural exports with 6 percent of the total.

Wheat's share of all U.S. grains shipped to the USSR is expected to decline this year from 1988's 48 percent. The United States has offered the Soviets over 18 million tons of wheat under the Export Enhancement Program during 1987-89. By May 1989, corn sales already exceeded 1988 exports of 8.5 million tons.

U.S. soybean and soybean meal exports to the USSR in 1989 could remain near 1988's $410 million. Cotton exports probably will not match last year's, which were the first since 1985 and were caused by poor quality of the 1987 Soviet crop.

With 1988's large increase in U.S. farm exports to the USSR, agriculture's share of total U.S. exports to the Soviets rose from 63 percent in 1987 to over 80 percent.

Soviet agricultural imports from all sources in 1989 may be more than 10 percent above the $16.5 billion estimated for 1988, and reach the 1980-85 average. Grain import expenditures could be more than double the 9-year low of 1987, primarily because of sharply higher unit costs, but also because of increased import volume following the smaller 1988 grain crop.

The dollar value of Soviet grain imports rose about 50 percent in 1988. In 1989, grain's share of total Soviet agricultural imports could approach 30 percent. Grain accounted for an average 35 percent of the USSR's farm imports during 1980-85, but only 17 percent in 1987.

Grain probably will replace sugar as the leading Soviet agricultural import in 1989. The value of oilseed and meal imports may continue to rise from 1984's 5-year low. Imports of livestock products may increase to the 1987 level. The volume and dollar value of meat and sugar imports probably fell in 1988.

The Soviets remain committed to a high degree of self-sufficiency in food. Food policies primarily emphasize increasing supplies rather than controlling demand.

The gradual increase in food supplies has not kept pace with high income-driven demand growth. The imbalance is exacerbated by a reluctance to raise the low government-set retail food prices. Expanded rationing and massive subsidies have resulted. About 20 percent of the Soviet budget now goes to cover the difference between high producer and low retail prices. Food subsidies are a major contributor to the USSR's growing budget deficit, now estimated at 11 percent of GNP.

Significant price system reform, originally to be in place by 1991, has been postponed. However, producer prices for farm commodities are to be raised in 1990. Wage growth continues to accelerate, rising 9 percent from first-quarter 1988 to first-quarter 1989. In the short term, the supply policies will not be effective enough to meet market requirements.

The supply policies focus on four areas:

- farming practices (the intensive technology program and improved research and extension);

- management and incentives (decentralizing management and financial responsibilities, which includes leasing)

- rural infrastructure (from roads to housing); and

- storage, processing, and marketing (including using defense and heavy industries).

The resistance of vested interests inhibits reforms, as does the government's vacillation on program details and the contradictions such as those concerning prices, equity, and efficiency issues. Because it will take time to rectify the inconsistencies, the USSR is not likely to realize the full potential of its agricultural resources as it enters the 21st century. However, agricultural production and productivity eventually could improve, thereby reducing the need for agricultural imports.

Failure to deal with contradictions in the reform programs ultimately could cause the Soviets to retreat from the reforms. This outcome would lead to stagnation in agriculture and expand the need for food imports.

According to official statistical reports, the USSR experienced strong economic growth in 1988. Net material product (NMP)--national income produced--increased by 4.4 percent. Gross national product (GNP), led by a surge in the services sector, reportedly grew by 5 percent. These figures are appreciably higher than the corresponding figures for 1987 of 2.3 and 3.3 percent, indicating an economic upturn. However, both likely are biased indicators of the rate of economic expansion in the USSR last year.

The five sectoral components of NMP are industry, agriculture, construction, and transportation and communication, plus a miscellaneous category consisting primarily of retail and wholesale trade and supply. Data indicate that most of the NMP growth in 1988 over 1987 must be attributed to construction and the final category, retail and wholesale trade and supply (table 1). Growth rates of roughly 5-8 percent in these two sectors are implied by growth in NMP of 4.4 percent and other available information.

Table 1--USSR: Economic growth indicators

Category	1987	1988
	Percent	
Net material product (national income produced)	2.3	4.4
Industry	3.8	3.9
Agriculture 1/	0.2	0.7
Transport 2/	0.7	1.2

1/ Gross production. The figure for 1987 was subsequently revised down to -0.5 percent. 2/ Volume of freight.
Source: Data are from plan fulfillment reports.

Growth in construction came primarily from increases in the value of unfinished construction work.[1] The introduction of new fixed assets increased by just 0.8 percent and the commissioning of new housing space for the population fell in 1988 by 0.1 percent.

The best available proxy for the last category of NMP is growth in retail trade of goods, which reportedly increased by 7.1 percent in 1988. However, food commodity trade, which accounts for over a third of retail trade, grew by less than 2 percent, implying a very large increase in retail trade of nonfood commodities. Available indicators of volume gains in production of these commodities do not seem to support such growth. The extent to which the growth in value terms might reflect quality improvements as opposed to inflation is open to question.

[1]*Izvestiya*, 2/4/89, p. 1.

A top economic analyst in the Soviet Union, Abel Aganbegyan, has estimated that from one-half to two-thirds of the growth in the Soviet measurement of NMP and GNP can be attributed to inflation.[2] A large part of this would likely be accounted for by the last category of NMP, but would be reflected in the other sectors as well. Estimates by Soviet economists place inflation as high as 6-8 percent in 1988. These calculations apparently represent a consumer price index, rather than a GNP deflator. The CIA estimates Soviet real GNP growth in 1988 of 1.5 percent, 3.5 percent below the Soviet published figure.[3]

Inflationary Pressures

In the last few years inflationary pressures have increased dramatically in the USSR. A major factor has been a series of very large State budget deficits. The State budget deficit is estimated at 65-80 billion rubles for 1988, equivalent to about 7-9 percent of Soviet GNP.[4] In recent years State expenditures for capital construction and social spending have increased, while some important revenue sources have shrunk. Budget revenue declined because of lower turnover taxes (generated in large part from sales of alcoholic beverages), lower world prices for oil, and reductions in consumer goods imports (which are sold to Soviet consumers at relatively high prices).

In 1988, growth in wages outpaced growth in labor productivity, adding to inflationary pressures. Average monthly wages increased by 7 percent in the State economy, compared with growth in labor productivity of 5.1 percent. This gap widened in the first quarter of 1989, with wages up 9.4 percent compared with productivity gains of 4.5 percent. To the extent that there was hidden inflation in the output data, the gap between wages and productivity was larger.

The impact of these inflationary policies has been evident on markets for consumer goods. Increases in consumer goods were not adequate to keep pace with income-driven increases in demand. State retail price control resulted in expanded rationing of some agricultural products, particularly meat, in 1988. Inflationary pressures were also evident in the large jump in the population's savings accounts (figure 1).

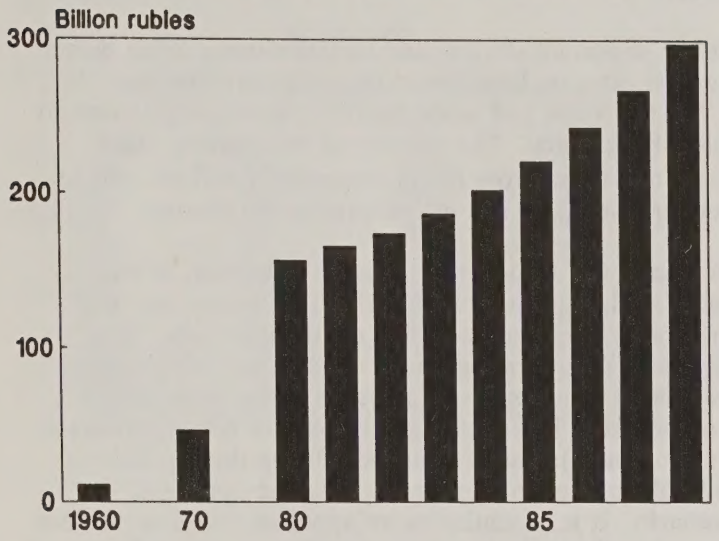
[2]*Pravda Ukrainy*, 11/10/88, p. 2.

[3]"The Soviet Economy in 1988: Gorbachev Changes Course," paper presented by the CIA and DIA to the Joint Economic Committee of the U.S. Congress, 1/14/89.

[4]*Ibid.* and *PlanEcon Report*, Vol. V, Nos. 6-7, 2/17/89.

Figure 1

USSR Savings Account Holdings



Efficiency

General Secretary Gorbachev hopes to improve incentives and increase flexibility throughout the economy. The move to enterprise self-financing is seen as a way of establishing more powerful incentives to control costs and increase output quality. Under the traditional economic management system, monitoring organizations largely determine enterprise activity; the State covers losses, and profits are heavily taxed if they exceed a "normal" level. Under the self-financing system, orders coming to the enterprise from the administrative hierarchy are to be greatly reduced and enterprises are to be more responsible for their financial results (including the right to retain a predetermined share of profits, regardless of how large profits might be).

The shift to self-financing is complicated by the inflationary pressures building in the economy. For self-financing to work, economically meaningful prices are necessary. However, price reform is being postponed because of the fear of unleashing an inflationary spiral. Parallels are frequently drawn with Poland, Yugoslavia, and the People's Republic of China (PRC). Furthermore, adoption of the self-financing reform has led firms to cut production of low-profit commodities, which in turn has led the State to introduce new subsidies to reverse this trend.

The attempt to introduce self-financing is, in turn, likely contributing to inflation. The State is apparently pouring funds into the economy to ensure sufficient enterprise profit. This is reflected both by the 10.3-percent profit growth in the State economy in 1988 and the apparently strong increase in budget expenditures. The large budget deficit could lead to a return of high tax rates for profitable enterprises, thereby undercutting the hoped-for incentives of a self-financing system.

Reductions in the role of the State in ordering output from firms (State orders) and in administrative control of resource allocation are supposed to continue. A greater share of economic activity is to take place on a mutually voluntary contract basis between enterprises. Improvement in this area was less than hoped for in 1988. State orders continued to account for over 90 percent of all production in the energy, chemicals, metallurgy, and machine-building industries.[5] In a situation of increasing shortages of inputs and supplies, enterprises might be more interested in maintaining the share of State orders, because this increases the likelihood of obtaining necessary production resources. By January 1989, 2 years after the attempt to introduce wholesale trade in these resources, only 3 percent were sold by that means (*Izvestiya*, 1/4/89).

In June 1988, the Law on Cooperatives was passed. It clarified the rights and responsibilities of cooperatives in establishing their operation, tax, and other financial relationships with the State. The law also clarified their place in the planning and resource distribution systems. Cooperatives are typically involved in food catering, other consumer service activity, and small-scale production (such as crafts and other small consumer goods). Collective farms are the most important type of Soviet cooperatives; how the Cooperative Law affects them is discussed below.

The cooperative sector (excluding collective farms) expanded sharply in 1988. By the end of last year, 1.4 million workers were employed in cooperatives, compared with 150,000 a year earlier. They remain a small share, though, of the total work force of some 130 million. Expansion of cooperative activity has also met with opposition from some segments of the population.

One question centers on the degree of regulation of cooperatives that is reasonable or fair in an otherwise highly regulated economy. Cooperatives are frequently attacked for charging prices that are too high. But the high prices reflect the large excess demand for quality goods and services and difficulties cooperatives are encountering in locating necessary inputs. Both of these factors stem from heavy regulation of most of the rest of the economy. In the year since the Law on Cooperatives was passed, new restrictions have been placed on their activity. Also, legally establishing a new cooperative has frequently been very complicated. These facts may keep cooperatives from assuming a truly significant role in the economy in coming years.

Prospects

The budget deficit remains the most pressing economic problem in the USSR in 1989. The deficit is being

[5]Bunich, P., *Voprosy ekonomiki*, No. 8 (1989), p. 63.

funded primarily by money creation, with strong inflationary impacts. Budgetary expenditures are planned to increase by 51 billion rubles, or more than 10 percent, in 1989.[6] Economists in the USSR anticipate that the budget deficit will reach 100 billion rubles this year.

The rapid increase in expenditures indicates the commitment to pour money into a variety of programs. Completing the shift to enterprise self-financing in 1989 could be a contributing factor, as well as the need to devote more resources to environmental protection, and recovery from the Armenian earthquake.

Increasing budget revenue in the future, through higher enterprise tax rates, could hurt incentives at a time when heightened incentives are very important. The possibility of increased personal income tax rates for the higher income categories is being discussed. Another possibility is selling State assets, such as machinery and housing to individuals.

The better opportunities for reducing the budget deficit probably lie on the expenditure side. Many Soviet economists are now stressing the need to take greater control over State investment spending. This line of thought calls for cutting losses on overextended investments and concentrating resources on key priorities (selective acceleration). This would mean temporarily or permanently abandoning many construction projects now underway.

Other important steps would be introducing much higher interest rates on bank credit than the current range of 0.75-3.0 percent and more tightly enforcing regulations to allow bankruptcy. The transfer of loss-making State firms and farms from the Government's welfare rolls to cooperative status is a major impetus for leasing.

For economic reform to proceed, the erosion in the ruble's value needs to be halted. This means not only greater Government spending controls, but also tying payments to enterprises more closely to goods actually purchased (enterprises frequently receive payment for production of low-quality goods that are never purchased by consumers). Successfully addressing these problems will take a number of years in the most optimistic scenario. It is becoming more apparent that a movement toward real economic reform (quality growth) will require in the medium term some sacrifice in nominal growth rates, at least for the goods-producing sector of the economy. *(Edward C. Cook)*

[6]*Literaturnaya gazeta*, No. 4 (1989), p. 11, translated in FBIS-SOV-89-019, 1/31/89, p. 80.

Agricultural Outlook

Agricultural output, which increased measurably in only one of the last 5 years, is expected to show modest growth in 1989. Prospects for livestock sector growth are constrained by slightly smaller feed supplies at the beginning of the year, and slightly smaller inventories. The gross value of crop output, which suffered consecutive declines of 2.7 percent in 1987 and 1988, is poised for recovery in 1989.

The financial performance of agriculture improved in 1988. Profitability of agricultural production on State and collective farms increased by 6 billion rubles, 22 percent. Most, if not all, of the increase was due to higher agricultural subsidies in 1988 (see the section on agricultural self-financing). The longer term financial picture remains far from resolved, with no indication yet that the very large outstanding and overdue debt of State and collective farms has begun to decline.

A positive development in Soviet agriculture in the last few years has been stable, and for some commodities, lower production costs. This represents a break with the longer term uptrend in costs that became evident beginning in the mid-1960's. In 1988, prime costs of production for agriculture reportedly declined.[7] Labor productivity continued to increase, up a reported 3 percent in the socialized sector. Given the smaller growth in production, this would imply reductions in the agricultural labor force, though the number of workers in collective farms was 12.2 million in 1988, unchanged from 1987.[8]

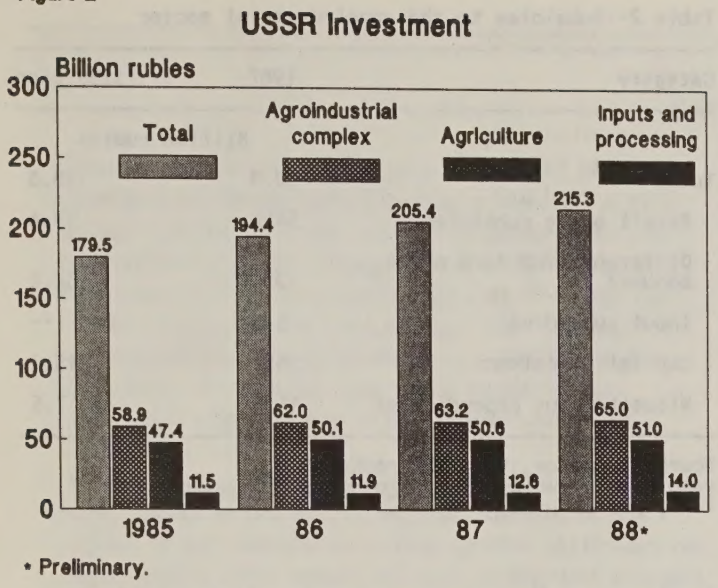
Investment in the agroindustrial complex increased modestly in 1988 and its share of total investment fell slightly. Nearly all of the increase occurred in the industrial sectors, such as food processing and agricultural inputs (figure 2). The investment plan for 1988-95 calls for 77 billion rubles to be invested in the food industry. Nearly half (37 billion rubles) is to be new equipment deliveries. Of the new equipment, 17.5 billion rubles worth is to be provided by defense industry enterprises.[9] Realization of these plans fell behind schedule in 1988, as only 5.2 billion rubles were invested in the food industry.

[7]*Vestnik agroproma*, No. 6 (1989), p.1.

[8]*Narodnoe khozyaistvo SSSR v 1987 g.*, p. 251.

[9]*Izvestiya*, 1/3/1989, pp. 1-2.

Figure 2



Demand and Supply

The situation in the Soviet food markets worsened in 1988. Food supplies entering the State trade network increased by 1.6 percent. Supply increases were larger than this for meat, butter, cheese, and vegetable oil. However, they were not adequate to match demand increases resulting from excessive growth in nominal income. Average prices on collective farm markets increased 5 percent in 1988, despite evidence of price controls on beef and pork in many cities.[10]

According to a deputy chairman of the USSR State Planning Committee (Gosplan), a significant step in eliminating excess demand for meat would be increasing meat production by 30-35 percent. The comparable figure for milk is 20-25 percent.[11] Taken at face value, this implies that effective annual demand for meat is over 80 kilograms per capita, compared with consumption of 65 kilograms. Excess demand for all food products has been estimated at 25-30 billion rubles, about one-seventh of the value of retail food sales.[12]

Policy Developments

In light of the worsening food market situation, officials appear to be increasingly reluctant to use higher retail price to reduce quantities demanded. Earlier, a revamping of retail prices was to be implemented in 1991. It now appears that any major food price reform will be delayed at least a couple of years.

General Secretary Gorbachev has staked out the position that a rise in food prices should not reduce living standards, implying some sort of income compensation. This point was more recently reiterated by the chairman of the USSR State Committee for Prices.[13] The problem, therefore, is not simply the political impact of a major food price increase (including a doubling or more of some livestock product prices), but the continued inflationary effects of replacing retail food subsidies with income compensation from the budget. The fear of an inflationary spiral derailing economic reform early on is being expressed more frequently in the USSR.[14]

The other important potential demand constraint, income, also does not appear to be an effective lever at present. In 1988 wages grew more rapidly than labor productivity, reflecting inflationary monetary policies of the State. The State may not be in a position effectively to check further wage increases without much tighter fiscal and monetary policies.

Supply Policies

Emphasis is squarely on supply-oriented policies as the way to deal with current market imbalances. The view generally accepted is that better incentives and greater economic accountability are essential to improve the agricultural sector. But opinions differ on how to proceed on price reform, on property rights expansion, on the role of administration in agriculture, and on incentives appropriate to a socialist system. The reformist view stresses opening up alternative forms of farming, including family farming, which would be allowed to develop on equal economic terms with the traditional State and collective farms. Reformists also stress the importance of opening up market trade in inputs and output, as opposed to administrative distribution.

The conservatives believe that greater reliance on family agriculture needs to be incorporated in the existing framework of State and collective farms. Because of shortages in input and output markets, conservatives stress the need to maintain directives in agriculture, at least for the next few years. While the reformists are motivated to propose more radical changes based on the actual performance and current predicament of Soviet agriculture, the conservatives point to models such as Czechoslovakia, where a relatively highly administered system provides abundant agricultural commodities.

[10]*Ekonomicheskaya gazeta*, No. 11 (1989), p.5 and *APK: Ekonomika, upravlenie*, No. 10, p. 39.

[11]Elistratov, G., *Planovoe khozyaistvo*, No. 12 (1988), p. 82.

[12]Kisilev, V., "Subsidy Free Prices," *Sotsialisticheskaya industriya*, 1/18/89, p. 2, translated in FBIS-SOV-89-020, 2/1/89, p. 80.

[13]*Trud*, 9/9/88, pp. 1-2, translated in FBIS-SOV-88-178, 1/14/89, p. 68.

[14]For an example see: *Literaturnaya gazeta*, 10/5/88, p. 10, translated in FBIS-SOV-88-193, 10/5/88, p. 65.

Particular policies being discussed or implemented include the system of leasing land and other assets to individuals or families, the introduction of a self-financing system in agriculture, and newly specified rights for collective farms. These are discussed in separate sections.

In March 1989, the Central Committee held a plenum devoted primarily to agriculture and discussed these and other policies. General Secretary Gorbachev championed the idea of leasing in agriculture, but offered little in the way of new incentives to encourage its adoption. The lease teams are now officially understood as being components of existing State and collective farms and must negotiate contract terms with those farms. While leases may extend up to 50 years, the terms of the leases may change frequently. Gorbachev also indicated that within 2-3 years farms would have much greater latitude in determining what commodities to market and how to market them. Without price decontrol, however, market shortages necessitate continued administrative interference in agriculture.

The nature of that administrative interference is changing. The State Agroindustrial Committee (Gosagroprom), the administrative organization for the agroindustrial sector, is to be abolished at the national level. Many of its most important functions will be passed to a new Council of Ministers Commission for Food and other central bodies such as Gosplan. Other functions are being passed to the republics. The republics now have greater authority in establishing State orders for the supply of agricultural commodities and in adjusting prices and using investment funds within their territories.

The local components of Gosagroprom--the rayon (district level) agroindustrial associations, or RAPOs--are also to be dissolved. The RAPOs currently exercise tremendous authority, and play important roles in agricultural policies now being implemented. Some of the RAPOs' responsibilities, such as concluding delivery contracts with farms or controlling the rayon centralized funds (a channel for shifting financial resources among farms), could be shifted up to the oblast (county) level. Other functions of the RAPOs could be eliminated or assumed by a reconstituted rayon administrative body. Clearly the State would like to eliminate RAPOs' interference in the day-to-day affairs of farms, which remains common.[15] This is more likely to be realized if the share of State orders in agricultural marketing is reduced.

Along with the emphasis on household leasing, new policies have been adopted to encourage production on the traditional household plots of State and collective farm workers. It is now legal for household plot farmers to own horses and other working livestock.[16]

[15]Efimov, V., *Izvestiya*, 12/5/88, p. 2.

[16]Borchenko, N., *Planovoe khozyaistvo*, No. 2 (1988), p. 88.

Table 2--Subsidies to the agroindustrial sector

Category	1987	1989 plan
	Billion rubles	
Total	98.8	108.8
Retail price subsidies	54.0	55.6
Differentiated farm price bonuses	10.9	32.2
Input subsidies	5.8	--
Capital investment	16.2	13.1
Miscellaneous expenditures	11.9	7.5

Source: Semenov, V., "Khozrashchet i samofinasirovanie," APK: Ekonomika, upravlenie, No. 3, 1989, p. 12.

Furthermore, limitations on the size of household plots and the number of livestock have been relaxed. They will now be determined at the local level. In the past they were set at the republic level and were usually 0.32 hectares for collective farm workers and 0.20 hectares for State farm workers.[17] There is not a clear picture of how much average plot size may be increasing as a result of this step.

Better use of agricultural raw materials is another aspect of current attempts to improve food supplies. Losses of agricultural commodities are said to reach 25 percent and more in some cases (including field and harvesting losses). The preliminary targets for the 13th 5-year plan (1991-95) call for agricultural production to increase by 16 percent, while output of the food industry increases by 25 percent.

Linkages between agricultural science and farming in the USSR are improving. As part of production intensification efforts, regional agricultural research institutes, which have traditionally been well insulated from farming practices, are being converted into scientific-production associations. These associations are responsible for formulating production systems that are then marketed to farms. A large share of the budget of the scientific-production associations (as much as 50-60 percent) depends on their ability to sell these systems to farms. The associations play the additional role of overseeing implementation and providing necessary advice to farms. In cases where production systems do not prove effective, the associations forfeit a portion of the payments received from the farm. How this complicated procedure works in practice remains unclear.

Other aspects of intensification efforts, particularly for crops, are being called into question. Improvements in cost-accounting (particularly elimination of input subsidies) are reducing the financial advantages of

[17]*Ibid.*

Self-Financing

Changes in the way agriculture is planned and managed are being introduced as a result of a 1988 decree entitled "On the transfer of enterprises and organizations of the Gosagroprom USSR system to full cost-accounting and self-financing."[18] With this decree, policymakers hope to increase financial accountability and decisionmaking authority at the local level--two particularly weak points of the traditional planning and management system of agriculture.

Key aspects of the decree include changes in the system of agricultural subsidies, stricter guidelines on the administrative control of agriculture, and changes in credit policy. In 1988, farms and enterprises in regions accounting for 60 percent of the agricultural land were converted to the new system (the Russian Republic [RSFSR], Belorussia, the Baltic republics, and a number of oblasts in the Ukraine, Kazakhstan, Uzbekistan, and Kirgizia). This year the remainder of the country adopted the new system.

The decree identifies critical aspects of Soviet agriculture in need of improvement, but in most cases does not significantly change traditional practices. An important example is pricing. In 1983 a special subsidy fund was created to provide bonuses to low-profit and unprofitable farms. Essentially this created a system of prices differentiated by farm. The disincentive effects of this approach were readily apparent and have now been acknowledged in the USSR.[19] Under the program, many poorly managed farms were able to achieve better financial results (including higher average wages) than neighboring well run farms.

The new system of self-financing does little to change this approach. Now included in the subsidy fund for financially troubled farms (which had been about 11 billion rubles per year) are funds previously used to subsidize inputs (6 billion rubles) and to make direct investments in State and collective farms (8.2 billion rubles), plus various other funds. In total the subsidy fund for financially weak farms now amounts to over 30 billion rubles a year (table 2).[20]

Republic councils of ministers and oblast associations are responsible for allocating these funds. Under the old program, a farm was supposed to qualify for bonuses based on its level of profitability (a lower profit associated with a higher bonus). Under the new program, bonuses are to be determined by a norming approach which evaluates a farm's productive potential based on the quality and quantity of land, labor, and capital at its disposal.[21] Bonuses are established based on the relationship of this evaluation of productive potential to actual production over a specified base period.

The elimination of input subsidies should result in better allocation of things like fertilizer and machinery. But the larger strategy of the new bonus fund is questionable. Its purpose is to provide a relatively painless transition to financial self-sufficiency for a financially troubled agricultural sector. The problem is that there is no easy way to do this without seriously weakening economic incentives. The financial health of a farm continues to depend to a great extent on the administrative apparatus rather than on its own performance. And because of the inability of at least half of all State and collective farms to achieve financial self-sufficiency without these subsidies and a reluctance to pursue bankruptcy proceedings on a wide scale, the Government is likely to continue bailing out poor performers. (The Government sees leasing as a way out of this dilemma.) The continuation of a pricing system differentiated by farm will work against using a reform of base prices to improve resource allocation within the country as a whole.

In the RSFSR in 1988, the first year under the new system, the share of unprofitable State and collective farms declined from 19 percent to 4 percent. Such a radical improvement was the result of higher prices paid rather than substantially reduced costs and apparently reflects a more effective means of coupling higher procurement prices with higher cost producers[22].

[18]*APK: Ekonomika, upravlenie*, No. 3 (1988).

[19]Semenov, V., *Finansy SSSR*, No. 7 (1987)

[20]Val'ter, *Ekonomika sel'skokhozyaistvennykh i pererabatyvayushchikh predpriatii*, No. 3 (1988).

[21]Naumov interview in *Izvestiya*, 1/19/88, p. 2, translated in JPRS-UEA-88-013, 4/28/88, pp. 47-50 and Lukinov, I. I., "Puti stabil'nykh ekonomicheskikh uslovii dlya razvitiya agropromyshlennogo kompleksa," in *APK: Ekonomicheskaya reforma i demokratizatsiya*, Moscow, Politizdat (1988), pp. 74-75.

[22]Emelianov, A. *Ekonomicheskaya gazeta*, No. 10 (1989), p. 13 and Kazakov, M. P., *Ekonomika sel'skokhozyaistvennykh i pererabatyvayushchikh predpriyatii*, No. 2 (1988), p. 2.

intensive technology (IT) programs. Ecological concerns about the spread of agricultural chemicals into the environment are also increasing, which may restrict further IT expansion or force a shift in the nature of IT programs, which heretofore have been very chemical intensive.

Prospects appear mixed for recovery in production growth rates. While moderate growth in 1989 is possible, changes in how agriculture operates are necessary for the kind of growth that is required over the next few years. Current policy discussion is touching upon critical areas, but big problems and uncertainties remain. Major stumbling blocks include resource shortages, a reluctance to increase prices, the question of equity for State and collective farms in particularly poor financial condition, and an entrenched system of administrative control. Progress overcoming these, if it is to occur, will be slow.

Lease Teams

A key aspect of revitalizing the performance of agriculture in the Soviet Union is establishing a sense of proprietorship in the land. Since 1987, General Secretary Gorbachev has been stressing the possibilities of leasing arrangements in agriculture. Under this system, individuals or small groups of individuals lease land and other assets from the State and contract for sales of specific agricultural commodities. The possibilities of this arrangement are large, particularly in regions like the Non-Black Soil Zone of the RSFSR which has extensive unutilized housing and land.

Thus far, there have been few people willing to surrender the largely guaranteed pay of State and collective farms for the risks of a leasing arrangement. Many potential lessees fear a reversal of the current favorable policy and an unwillingness by authorities to adequately reward hard work. To overcome this, Gorbachev and others have mentioned the possibility of very long leases (50 years or more). The right of inheritance of leased and purchased assets is now being discussed. It appears that most leases currently in place are for appreciably less than 50 years.

Gorbachev has expressed firm support for lease teams as subunits of State and collective farms. Some prominent agricultural economists have argued in favor of lease teams signing agreements directly with local government bodies, fearing that the State and collective farms will have too much power and interest in contravening the spirit of the leasing arrangement. One way farms might do this is by adjusting terms and conditions based on a lessee's productivity. In such a situation, a lessee may have little recourse. Widespread adoption of a leasing system would, in fact, make redundant many farm administrators and specialists.

The reasons for placing lease teams under control of State and collective farms include not only commitment to these traditional organizations, but the need to maintain a means of control over the lease teams, at least in the interim. Another reason is that State and collective farms provide a safety net of economic and social support for the less skilled and elderly in the countryside. Lease teams independent of these farms could threaten their ability to continue providing this support, particularly because the most enterprising and skilled workers would be the first to opt for a leasing arrangement. Finally, lease teams might have a hard time locating necessary services and support if they are not at least associated with State and collective farms, something evident from the history of private farming in postwar Poland.

The relationship between lease teams and the farms overseeing them remains uncertain. Lease teams are fully dependent on the farms to obtain inputs and services and must satisfy minimum contract deliveries at prices lower than the farm receives when it sells to the Government. Lease teams are allowed to purchase machinery, but prices they pay are often higher than those paid by State and collective farms. A new law on leasing might be ready by the end of the year and will be necessary if leaseholders are to have any leverage at all in dealing with their sponsoring farms.

Parallels between the Soviet leasing idea and the PRC household responsibility system are not well founded at this point. Not only does the administrative and operating structure of State and collective farms in the USSR remain intact, but there are serious doubts in the USSR whether the Government will actually tolerate a farmer's getting rich as a result of hard work. The March Plenum provided few new incentives to lure workers into signing up for leases. Not only are firm guarantees needed that the terms of the lease will not be abused, but improved provision of small-scale machinery and other support appropriate to lease teams may prove essential if they are to assume a prominent place in the Soviet countryside.

Law On Cooperatives

In June 1988, the "Law on the Cooperative System in the USSR" was published (*Pravda*, June 8, 1988). It potentially opens the way to significant changes in the functioning and degree of autonomy of the 27,000 collective farms, which are considered cooperatives rather than State enterprises. The collective farms produce about 35 percent of agricultural output. The law may eventually serve as a model for introducing changes in the 26,000 State farms, which also account for about 35 percent of agricultural output. Major conceptual points of the law include the following:

Internal collective farm autonomy--Collective farms independently plan production and financial activity. The collective must report, however, to appropriate administrative organs for the purpose of regional coordination. Collective farms are entitled to engage without restriction in nonagricultural activities not prohibited by law. At the same time they are expected to increase the production of crop and livestock output with the aim of satisfying the nation's needs. Collective farms are encouraged to make use of family and other contracting teams and the leasing of land and capital.

Farm linkages--Crucial aspects of improved collective farm autonomy will be the farm's rights vis-a-vis the planning hierarchy and its ability to market output and obtain inputs and services. The law states that collective farms may join RAPOs and other associations on a voluntary basis and are entitled to withdraw at any time. It also states that cooperatives voluntarily undertake State orders. Targets for State orders are passed down through administrative channels as far as the rayon level, but not directly to collective farms (nor are they passed directly to State farms). Instead, RAPOs negotiate with member farms and use a number of measures to "encourage" collective farms to conclude contracts with the purpose of satisfying rayon State orders. These measures include "the system of prices, the guaranteed sale of produce, the allocation of material and technical resources, and other economic methods" (article 34, paragraph 2). These measures sound potentially very powerful and convincing from the farm's point of view. The law gives collective farms the right to conclude contracts for the sale of output without specific priority reference to those contracts satisfying State orders. The law does not address improved links between farms and input producers.

Prices--The law discusses changes in the system of administratively determined prices. As in the past, price zones will be established (how large these will be is not specified). Within each zone, prices will be set to ensure that properly managed farms can achieve financial self-sufficiency in "relatively inferior natural and economic conditions" (article 34, paragraph 4). "Collective farms situated in relatively superior conditions within the zone must pay the State rent that takes into consideration the quality of the land and other natural and climatic conditions." Contract sales to satisfy State orders are made at these administered prices, while other sales are made at prices mutually agreed upon by buyer and seller. This pricing system is supplemented, however, by the extensive bonuses for financially weak farms.

To a large extent, the spirit of the new Cooperative Law has thus far been bypassed by shortages in input and output markets and an entrenched administrative apparatus. It is uncertain what effect the call to disband the RAPOs, made at the March Plenum this year, will have on the situation. Certain administrative functions are expected to outlive the RAPOs, whether these are now exercised by the oblast associations or by a reconstituted rayon level organization. The functions include negotiating State purchase orders with the farms, controlling the allocation of resources, and under the new self-financing, establishing differentiated purchase prices by farms. These powers will continue to restrict the autonomy of collective farms.

There is no indication that State orders differ appreciably from earlier mandatory sales targets. (At the oblast level, grain orders are the same as the previous sales targets.) On average, this indicates that farms still face State orders which account for the lion's share of their marketable output. Reinforcing this pattern is the fact that alternatives to the State marketing network remain underdeveloped and underused. New rights to market output through nonstate channels, introduced in March 1986, have been used only to a small extent. One factor is the way Government sales prices are established. In any year, once sales reach the annual average of a farm's sales in 1981-85, price bonuses kick in, which make further sales to the State much more attractive, thereby weakening the incentives to pursue sales through nonstate channels. Tying the new bonus payments to State orders further weakens incentives to use other marketing channels.

In an environment of shortages, either prices are allowed to increase, or methods of administrative control are necessary. In the USSR, pressure to limit further price increases has meant reliance on the latter method. Even with higher prices, though, the system of relative prices may not elicit the production mix that planners desire, again requiring administrative interference. *(Edward C. Cook)*

Agricultural Inputs

As in much of Soviet industry, production emphasis in agriculture is on quantity rather than quality. The economic reforms appear to be having some effect in changing this, although a multitude of problems remain, accounting for much of the high cost of Soviet farm production. Investment lags behind plan in agrochemicals and in the sectors of Soviet industry which would build more machinery for farming and food processing and distribution, despite the switchover of some military plants for these purposes.

Agricultural Machinery

In discussing the need to improve the equipment quality, Soviet commentators point out that the Soviet Union produces far less agricultural output than the United States, despite the fact that it manufactures "more grain harvesting combines by a factor of 16, six times more tractors, and 50 percent more chemical fertilizers."[23] *Pravda* announced that substandard production was present in 172 of 236 enterprises of the USSR Ministry of Agricultural Machine-Building.[24] The principal farm newspaper (*Sel'skaya zhizn'*, 9/14/88) issued the general indictment that most of the machines used by collective and State farms were obsolete, inefficient, or unreliable.

Many machines continued to be delivered incomplete; in 1987, 5,000 newly delivered combines were unusable at harvest. Approximately 7,000 combines had been delivered incomplete (including 1,500 of the Don model, and more than 5,000 of the Niva model). In all, defects present in newly delivered machines were so numerous that repairs cost 1.3 million rubles in 1987 just to get the equipment running.[25] Downtime caused combines to harvest only 8.4 hectares per day in 1987, the same as in 1965, and down from 11 hectares 6 years before.[26] Because of breakdowns and lack of spare parts, Kazakhstan's Kustanai oblast reportedly lost 165,000 tons of grain in 1987, worth 24 million rubles. On the whole, the excessive weight of tractors caused estimated losses of 1 million tons of fuel, and excessive soil compaction cost 15 million tons of grain.[27]

Too few machinery models with too few attachments are produced. For every 100 rubles of power machinery in 1987, there were 153 rubles worth of attachments and implements whereas 260:100 is the ratio prescribed by planners for crop farming, and 300:100 for livestock production.[28]

The economic reforms have forced farms to pay more attention to their machinery needs and caused demand to drop, especially for poorer quality models. It has sometimes been difficult to stop the flow of unwanted machines, as for instance in Promyshlennovskii rayon (Kemerovo oblast), which ordered only 36 combines in 1987, but was sent 150 Niva and Enisey models. Combines continued to be delivered in 1988, although none was ordered.[29]

The farm machinery industry has been seriously affected by reforms which require that farms must be profitable and eliminate subsidies for machinery prices. "Last year when collective farms were allowed to buy whatever equipment they needed on the market or from plants of their choosing, many manufacturers found themselves in a difficult situation. Their products were shunned for their poor quality and sky-high prices."[30]

In 1987, machinery industry plans were not met because of rejection of poor-quality deliveries. Tractor deliveries declined in 1987 and again in 1988 (table 3). A factory being readied to produce even more unwanted heavy tractors was diverted to automobile production. After declining, combine deliveries picked up in 1988. Commentators credit consumer resistance to the Enisey combine (the Niva was preferred) with spurring the Krasnoyarsk Agricultural Machinery plant (itself ineligible for Government subsidies) to hurry an acceptable new model into production.[31]

The farm machinery industry sought to increase contracts and licensing agreements with foreign equipment manufacturers. At the same time, it failed to use imported equipment well. Its stocks of uninstalled equipment increased by 430 million rubles (or 39 percent), of which 282 million rubles' worth stood in warehouses, some items for as long as 3 years.[32]

In 1988 and 1989, the Government eliminated about 3 billion rubles in subsidies for farm machinery. The subsidy for tractors had been between 36 and 41 percent of cost. For instance, farms paid only 12,000 rubles for a K-700A tractor which cost industry 18,700 rubles to produce. A Don 1500 combine which had sold for 12,000 rubles now sells for 38,000.[33]

[23]*Kommunist*, (September 1988), translated in JPRS-UKO-89-002, 1/24/89, p. 25.

[24]*Pravda*, 6/25/88.

[25]*Izvestiya*, 4/14/88.

[26]*Kazakhstanskaya pravda*, 7/20/88.

[27]*Sel'skaya zhizn'*, 11/10/88.

[28]*Vestnik statistiki*, No. 1 (1989), p. 10.

[29]*Pravda*, 12/30/88.

[30]TASS in English, 0956 GMT, reported in FBIS-SOV-89-053, 3/17/89.

[31]*Ibid.*

[32]*Pravda*, 3/5/89, translated in FBIS-SOV-89-046, 3/10/89, pp. 89-90.

[33]*Sel'skaya zhizn'*, 1/12/89.

Table 3--Tractors, grain combines, and trucks: Inventories, deliveries, and scrapping rates, USSR 1/

Year	Tractors			Grain combines			Trucks		
	Inventories	Deliveries	Scrapping rate 2/	Inventories	Deliveries	Scrapping rate 2/	Inventories	Deliveries	Scrapping rate 2/
	Thousands		Percent	Thousands		Percent	Thousands		Percent
1966-70 average	1,821	293	12.6	578	94	13.8	1,105	133	NA
1971-75 average	2,189	333	12.3	661	90	12.3	1,282	220	13.6
1976-80 average	2,495	361	12.9	701	108	14.3	1,527	268	15.4
1981-85 average	2,695	370	12.3	791	112	11.6	3/ 1,692	3/ 274	3/ 13.9
1986	2,844	394	13.4	805	111	13.4	4/ 1,348	317	22.3
1987	2,759	354	15.4	774	93	15.4	1,350	330	24.3
1988	NA	5/ 330	NA	NA	5/ 100	NA	NA	5/ 300	NA

NA = not available. 1/ Inventories are for the end of the year. 2/ Equal to deliveries minus change in inventories divided by inventories at the end of the preceding year. 3/ Average for 1981-83 from Soviet sources. No data were given for 1984. In 1988, the Narodnoe khozyaistvo v 1987 gave inventories of 1,327,000 for 1987. Thus, the implied scrapping rate for 1984-85 is 58 percent, as the large stock of nonfunctional trucks was written off inventories. 4/ The 1987 Narodnoe khozyaistvo za 70 let (p. 207) reported inventories of 1,917,000, but the 1988 Narodnoe khozyaistvo v 1987 (p. 166) reported 1,348,000. 5/ Pravda, 1/22/89.

While deliveries of tractors and combines were deliberately allowed to drop until their quality improved, truck deliveries expanded significantly in the last several years. Recorded inventories fell greatly in 1986 for trucks and in 1987 for tractors and combines, because machines long broken down or cannibalized for spare parts were finally written off.

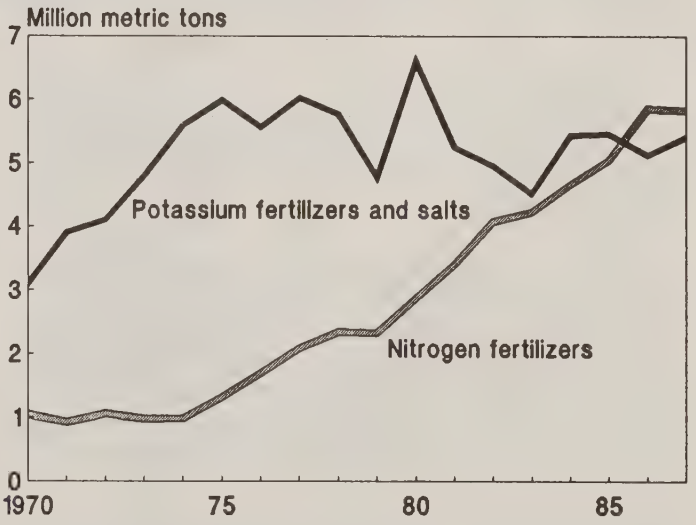
More resources were devoted to improving food processing capacity in 1988, although only 78 percent of planned investment was made between 1986 and 1988.[34] About 260 enterprises of the former Ministry of Machine-Building for Light and Food Industry were transferred to eight other ministries, including various defense ministries. Over 200 design bureaus for military equipment now devote part of their resources to the development of food and farming equipment. In addition, some 250 defense industry plants have been retooled to equip a planned 29,000 new processing enterprises and re-equip 38,000 enterprises already processing raw agricultural output.[35]

Agrochemicals

In 1988, Soviet mineral fertilizer output exceeded the production of the United States, France, West Germany, and Great Britain combined. The USSR exports substantial amounts of this production (figure 3).[36] But partly because of continued flaws in the fertilizers' quality, composition, and allocation, farm production continued to respond disappointingly. Imports continued to play an important role, although there was some success in improving domestic production. The use of chemical fertilizers and pesticides became increasingly controversial from the standpoint of protecting the Soviet environment.

Figure 3

USSR Fertilizer Exports



Soviet mineral fertilizer output reached 37.1 million tons in 1988, although the growth rate (2.2 percent above 1987) was the lowest in several decades (table 4). At the same time, deliveries of mineral fertilizers to farms declined by 1.1 percent (312,000 tons), reducing the ratio of deliveries to fertilizer production. Underlying these trends were ecological concerns and pressures on farms

[34] *Pravda*, 3/16/89, p. 3.

[35] *Izvestiya*, 1/3/89.

[36] *Khimicheskaya promyshlennost'*, No. 5 (1988), translated in JPRS-UEA-88-020-L, 10/6/88, pp. 2-5.

Table 4--Production and deliveries of mineral fertilizers to agriculture, USSR

Year	Total	Nitrogen	Phosphate	Ground phosphate rock	Potash	Trace elements
			1,000 metric tons 1/			
Production						
1966-70 average	10,379	4,210	2,030	955	3,177	7
1971-75 average	17,877	7,248	3,451	1,032	6,138	8
1976-80 average	23,328	9,283	5,300	828	7,910	7
1981-85 average	29,294	12,573	6,747	774	9,192	8
1986	34,737	15,200	8,540	788	10,200	9
1987	36,300	15,700	8,900	791	10,900	9
1988 2/	37,100	16,000	9,100	801	11,190	9
Deliveries						
1966-70 average	8,452	3,520	1,847	857	2,221	7
1971-75 average	13,802	6,209	2,978	904	3,703	8
1976-80 average	18,063	7,632	4,460	827	5,137	7
1981-85 average	22,156	9,790	5,766	774	5,817	9
1986	26,514	11,475	7,567	787	6,677	8
1987	27,412	11,787	7,800	764	7,052	9
1988 2/	27,100	11,700	7,700	3/ 787	6,904	9

1/ Nutrient weight basis. Nitrogen--20.5 percent N, phosphates--18.7 percent P2/05, ground phosphate rock--19 percent P2/05, potash--41.6 percent K2/0. 2/ Estimates except total and footnote 3. 3/ Sel'skaya zhizn', 1/14/89.

to lower costs and on the country to gain hard currency by increasing fertilizer exports. Chemical fertilizer subsidies valued at 2.9 billion rubles were eliminated in 1988 and 1989.[37]

Overall, the use of mineral fertilizers increased 2.6 times from 1970 to 1986 (table 5). Application rates per hectare of sown area approached 118 kilograms in 1986, compared to the U.S. rate of 92. The average Soviet application rate first exceeded the U.S. rate in 1983. Fertilizer application rates tend to be higher in Western Europe, where fertilizer is more effective because of the climate, than in the USSR.

The economic effectiveness of agricultural chemicals has been disappointing and their increased application has been subject to rapidly diminishing returns. M. Lemeshev points to situations in which greatly increased fertilizer application has not increased yields (e.g., sugarbeets in Moldavia).[38] Between 1975 and 1985, gross agricultural output in comparable prices increased by only 20 percent, while the volume of fertilizer deliveries and pesticide use increased by nearly 50 percent.

[37]*Ekonomicheskaya gazeta*, No. 6 (1989), p. 11.

[38]*Vestnik sel'skokhozyaistvennoi nauki*, No. 6 (1988), pp. 130-133 and No. 10 (1988), p. 23.

Although there have been advances in several areas, there are many complaints about the Soviet fertilizer industry's production. About 90 percent of production is now compounded and concentrated and 60 percent is granulated. The average nutrient content in manufactured fertilizers, which was only 38.4 percent in 1980, had risen to 42 percent in 1987. Practically all

Table 5--Application of mineral fertilizer to selected crops, USSR 1/

Year	Grain excluding corn	Corn for grain	Cotton	Sugar-beets	Potatoes
Rate			Kilograms per hectare		
1975	42	155	391	399	280
1980	51	215	417	438	274
1985	72	200	376	455	293
1986	86	226	390	443	304
1987	89	209	410	419	284
1988	89	207	395	420	274
Share fertilized			Percent		
1975	48	94	99	99	93
1980	57	95	94	99	93
1985	71	94	98	99	95
1986	73	97	99	99	95
1987	72	95	100	100	95
1988	73	94	96	99	93

1/ Nutrient weight basis.
Source: Vestnik statistiki, various issues.

Table 6--USSR crop area under intensive technology

Year	Grains 1/	Sugarbeets	Sunflowerseed	Potatoes	Other crops 2/	Total
			Million hectares			
1985	2/ 18.7	3/ 2.4	4/ 1.2	5/ 0.3	NA	NA
1986	6/ 29.0	7/ 2.6	4/ 1.9	NA	NA	NA
1987	8/ 35.4	2/ 2.8	6/ 2.2	2/ 0.55	9/ 3.05	10/ 44.0
1988 preliminary	10/ 38.8	11/ 3.0	11/ 2.5	2/ 1.0	9/ 4.4	2/ 49.7
1990 plan	12/ 50.0	13/ 3.3	NA	2/ 2.0	NA	14/ 60.0
1995	15/ 60.0	NA	NA	NA	NA	NA

NA = not available.
1/ Includes corn for grain, barley, rice, pulses, etc. 2/ Vestnik agroproma, No. 1, 1988, p. 3. 3/ Ekonomika sel'skogo khozyaistva, No. 9, 1986, p. 21. 4/ Maslichnye kul'tury, No. 1, 1987, p. 3. 5/ Razvitie sel'skogo khozyaistva SSSR, 1986, p. 46. 6/ Pravda, 7/19/87. 7/ Sakharnaya promyshlennost', No. 11, 1987, p. 2. 8/ Vestnik statistiki, No. 5, 1988, pp. 3-4. 9/ Estimate. 10/ APK: Ekonomika, upravlenie, No. 8, 1988, p. 3. 11/ Vestnik statistiki, No. 8, 1988, p. 31. 12/ Zakupki sel'skokhozyaistvennykh produktov, No. 4, 1987, p. 2. 13/ TOFAS, No. 352, 12/20/88. 14/ Sel'skaya zhizn', 2/6/86. 15/ Pravda, 4/11/89.

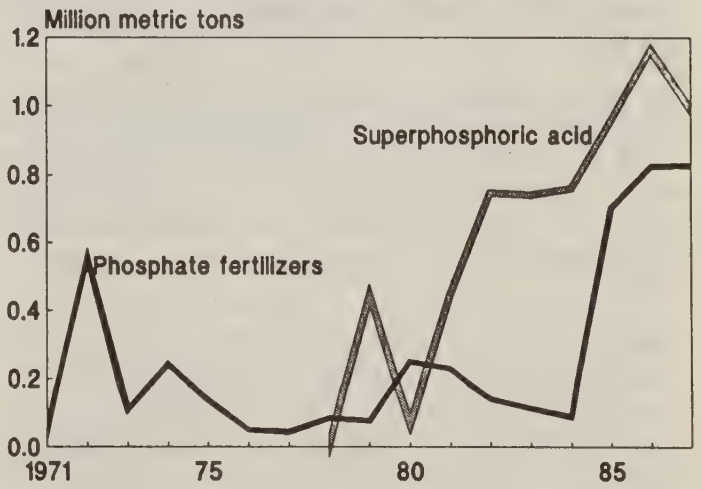
soluble nitrogen and phosphorus fertilizers are supplied to farms in granulated form. However, consumers complained about their moisture content, caking, and granular strength. A report written in 1988 noted that nitrogen fertilizers caked badly in storage, and that granules of carbamide and ammonium nitrate and various compounds were weak and nonuniform.[39] Additionally, whereas it had long been the goal to reduce single-nutrient fertilizers in favor of more compound fertilizers, the more exacting requirements of IT increase the need for single-nutrient fertilizers for farms to custom mix themselves (table 6).

The major limiting soil nutrient in the USSR continues to be phosphorus. About 76 million hectares are judged to be poor in phosphates and 45-50 kilograms of phosphate should be applied per hectare annually, whereas only 31 kilograms actually are applied. (In Siberia and the Far East, which are particularly poor in phosphates, 18-23 kilograms were applied.) The absence of rich domestic phosphate deposits and lack of capacity to process low-grade deposits caused imports of phosphate fertilizers and superphosphoric acid to surge in the mid-1980's (figure 4).

Observers doubt that domestic capacity will meet phosphate needs for the next 10-15 years. Among other approaches, increased production of ground phosphate rock shows promise in helping solve the problem. It is cheap, uses less energy, and is easy to produce. It is argued that this material is almost as effective as standard phosphorous fertilizers in high-acid soil areas such as the Non-Black Soil Zone, Siberia, the Far East, the Baltics, the Caucasian Republics, and parts of the Ukraine. Production of ground phosphate (P_2O_5) has declined, however, to less than 800,000 tons, while the

Figure 4

USSR Phosphate Fertilizer and Superphosphoric Acid Imports



requirements in the RSFSR alone stand at 3.3 million tons.[40] Of 250 phosphate deposits usable for phosphate rock throughout the country, only 12 are now operative.

Still, partly because of the decreased application of nitrogen and partly because of slowly increasing availabilities of phosphates, the balance of fertilizer available to farms has improved: from a nitrogen:phosphorus:potassium ratio of 1:0.67:0.59 in 1980 to 1:0.72:0.58 in 1987.[41]

Another deficiency of Soviet fertilizer composition is the lack of fertilizer trace elements. Soviet industry produces

[39] *Khimicheskaya promyshlennost'*, op. cit.

[40] *Ekonomicheskaya gazeta*, No. 25 (1988) and *Sel'skaya zhizn'*, 1/14/89.

[41] *Khimicheskaya promyshlennost', op. cit.*

mostly boron fertilizers. Only in mid-1987 did it begin to produce trace-element fertilizers with other metals. Trace elements are especially important for the high yields expected in IT. American arable land area is only three-fourths that of the USSR, but more than ten times as much trace-element fertilizer is used.[42]

Users continued to complain about insufficient packaging (few small packages and the lack of plastic) which led to caking and moisture gain and loss; poorly timed deliveries; and the lack of proper storage and loading equipment, which also was detrimental to workers' health.[43]

From one point of view, pesticide production is too little, but from another, pesticides are overused and ineffective. Soviet chemical industry spokesmen tend to emphasize that pesticide production lags behind chemical fertilizer production in quantity and in quality, as measured by the limited assortment and older vintages of pesticides produced. For instance, it is reported that in "countries with intensive agricultural development 30-50 kilograms of pesticides are produced per ton of manufactured fertilizer, while in the USSR this figure is less than 15 kilograms."[44] However, the USSR also heavily imports pesticides: "We purchase abroad more than one-half the chemical components for the production of pesticides"[45] (figure 5).

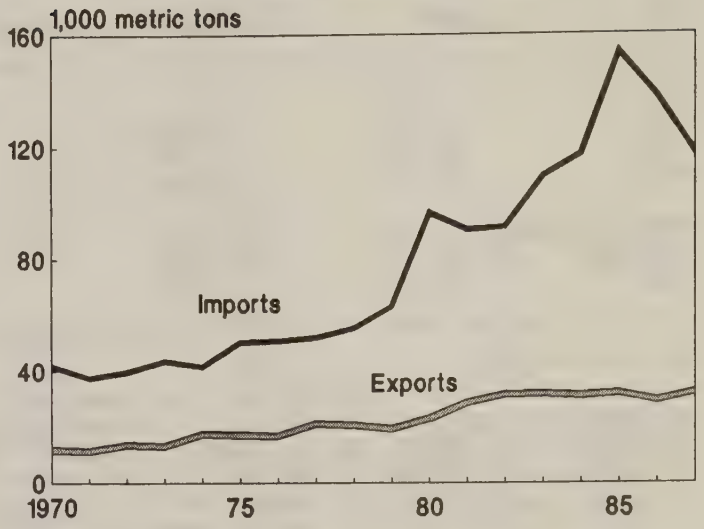
No data on domestic production of chemical pesticides were included in the annual plan fulfillment report for 1988. Estimated deliveries in 1988 were expected to reach 375,000 tons, 14.7 percent over 1987. As compared to 1985 when they took a sharp jump, imports of plant protectants fell by 10 percent in 1986 and 15 percent in 1987.

Because of domestic production and imports, Soviet pesticide use is now quite high. A. V. Yablokov, a corresponding member of the Soviet Academy of Sciences, wrote in late 1988 that use is actually higher than in the United States, where pesticide use is 1.6 kilograms per hectare (covering 61 percent of the arable land) and 1.5 kilograms per capita and declining. The Soviet figures are 1.9 kilograms per hectare (covering 87 percent of arable land) and also 1.5 kilograms per capita.[46]

As with mineral fertilizers, the assortment of domestically produced pesticides is limited, although it is expanding. In 1988 the assortment was said to include only "89

Figure 5

USSR Plant Protectant Trade



designations, few of which are highly effective." The number is to be expanded to 159 by 1995. Most pesticides presently in use are based on formulations that are at least 20 years old.[47] A total of 600 chemical compounds, from which as many as 10,000 preparations are made, is said to be available in the world. Analysts argue that the Soviet Union would be well advised to limit the import of commodities and instead increase the importation of modern pesticides in order to increase yields.[48] The USSR has only begun producing the less toxic pyrethroids.

While the yields of highly fertilized crops are particularly vulnerable to weed and insect pests and diseases, an increasing number of ecologically minded Soviet writers insist that the quantity of chemical protection is already sufficient, but a major threat to the environoment.

A number of specific points relating to agrochemical production and use have erupted in the era of glasnost'. The method of manufacturing leaves phosphate fertilizers contaminated with cadmium, strontium, fluorine (150 kilograms of fluorine enter the soil for every ton of phosphorus) and other toxic elements.[49] The rural newspaper *Sel'skaya zhizn'* reported that "the application of pesticides now escapes the control of the State and society."[50] In a situation similar to that of the West, but exacerbated by inadequate equipment to safely apply and monitor agrochemicals, "the major portion of chemicals

[42]*Sel'skaya zhizn'*, 1/27/89.

[43]*Sovetskaya Rossiya*, 8/14/88.

[44]*Khimicheskaya promyshlennost'*, op. cit.

[45]*Kommunist*, No. 15 (1988), translated in JPRS-UKO-89-003, 1/25/89.

[46]*Ibid.*

[47]*Khimicheskaya promyshlennost'*, op. cit.

[48]*Sel'skaya zhizn'*, 7/29/88.

[49]*Vestnik sel'skokhozyaistvennoi nauki*, No. 10 (1988), p. 23.

[50]*Sel'skaya zhizn'*, 7/29/88.

being applied does not fall on the plants, but is scattered into the atmosphere, polluting soil, water, and air."[51] Fertilizers and pesticides are often applied manually, because of the lack of equipment and proper packaging, creating a threat to human health which Soviet scientists have termed "barbarous."[52]

Soviet scientists also lament the lack of proper testing for environmental effects of pesticides. The All-Union Scientific Research Institute for the Preservation of Nature and Game Reserves has been ordered to stop environmental impact analysis.[53] There is no plant protection research institute east of the Urals, and no zonal system of standards for the use of toxic agrochemicals. As a result, deaths and even massive loss of wildlife have occurred.[54]

The threat to wildlife and human health and also the poor production response associated with Soviet agrochemical use are due to several interrelated factors. One is the lack of training about how to use these powerful products. Another is the lack of industrial complements, such as application and laboratory measuring equipment. A third reason has been the pressure from planning for gross production, which causes large quantities of poor-quality chemicals to be produced in limited assortment. A fourth reason, related to the last, is that lack of concern for costs has caused farms to use doses that are too high.

The environmental imbalances which are observed in the West are accentuated by the economic imbalances of the USSR. Nitrogen fertilizer is produced in abundance, without phosphate and potassium complements, leading to low yields. As a result, some vegetables have nitrate levels, 2-5 times the norm.[55] (Lemeshev points out that fertilizer applications can be three or four times as large as in the USSR, as they are in Western Europe and Czechoslovakia, and still yield healthy food, if fertilizer is balanced.)[56] A limited variety of pesticides of unknown strength leads to their heavy application, and to increased pest resistance, which leads to even heavier application.

The Soviet Union is peculiarly characterized by not replenishing the humus in its soils. According to *Pravda* (9/22/88), the Soviet Union is experiencing a catastrophe in declining soil fertility. The average nationwide use of organic fertilizers is still only about 4-4.5 tons per hectare compared to the recommended 7-8 tons. While leading farms apply as much as 100 tons per hectare, the majority of State and collective farms apply only a few kilograms.[57]

Table 7--USSR irrigated and drained land

Year	Irrigated		Drained	
	Year end	Commissioned	Year end	Commissioned
	Million hectares			
1970	11.1	.396	10.2	.815
1975	14.5	1.180	13.7	.982
1980	17.5	.650	16.9	.648
1981	18.0	.643	17.0	.696
1982	18.6	.637	17.5	.685
1983	19.1	.714	18.1	.728
1984	19.5	.676	18.6	.691
1985	20.0	.642	19.1	.693
1986	20.5	.614	19.5	.700
1987	20.5	.554	19.4	.633

Irrigation and Drainage

Data are not yet available on the amount of newly commissioned irrigated and drained lands during 1988. However, the additions probably were less than 1987's 554,000 newly irrigated hectares and 633,000 newly drained hectares (table 7). Although the official policy is to cut the backlog of incomplete projects, the effectiveness and environmental consequences of projects already underway are being reevaluated and some may be abandoned. New irrigation and drainage commissionings were each off 10 percent in 1987.

The official inventory of improved land at the beginning of 1989 likely was little above that at the beginning of 1987, despite the over 7 billion rubles spent in 1988. Although 3.837 million hectares of irrigated land were newly commissioned in 1982-87, the stock of irrigated land increased only 2.5 million hectares (none in 1987). Over the same period, 4.13 million hectares of newly drained lands were commissioned, but the inventory of drained land increased only 2.4 million hectares. Farms should be even more anxious to remove faulty irrigation and drainage systems from their inventories. The new guidelines, which tie pay to productivity, will be based in part on the amount of "improved land" that a farm has.

The volume of irrigation and drainage projects initiated in the future should be smaller than in the past several decades. The large budget deficit, combined with increasing awareness of possible negative environmental effects, will constrain central Government funding of massive new projects. The Soviets are emphasizing the need to concentrate on reconstruction and maintenance of existing systems. In 1988, comprehensive reconstruction was carried out on 530,000 hectares.

[51] *Khimicheskaya promyshlennost'*, op. cit.

[52] *Sel'skaya zhizn'*, 7/29/88.

[53] *Ibid.*

[54] *Ibid.*

[55] *Vestnik sel'skokhozyaistvennoi nauki*, No. 10.

[56] *Sel'skaya zhizn'*, 1/27/1989 and *Vestnik sel'skokhozyaistvennoi nauki*, No. 6 (1988), pp. 130-133 and No. 10 (1988), p. 23.

[57] *Sel'skaya zhizn'*, 9/22/88.

During 1971-85, capital investments in land improvement claimed 113.5 billion rubles, or 28 percent of all agricultural investment. The results were 118 huge reservoirs, 11.7 million hectares of irrigated lands, and 11.5 million hectares of drained lands. In the same period, poor operational practices drove out of circulation 2.9 million hectares of irrigated and 4.3 million hectares of drained lands, equal to 25 and 37 percent of the total of new meliorated areas. Other losses occurred as rising underground water, secondary salinization, and soil degradation lowered the efficiency of the improved lands.

In 1981-85, the introduction of new meliorated meadows dropped 2.3 times from 1971-75, the area of improved meliorated lands decreased by 28 percent, and that of technically upgraded ones by 23 percent. The return on investment in amelioration has been lower than planned; two-thirds of irrigated lands failed to achieve projected yields.[58]

[58]*Vestnik sel'skokhozyaistvennoi nauki*, No. 6 (1988), pp. 133-134 and No. 11 (1988), p. 12.

Chernobyl

Soviet officials have only recently begun to acknowledge the magnitude of the contamination caused by the accident that began April 26, 1986, at the Chernobyl Atomic Energy Plant in the extreme northern part of the Ukraine bordering Belorussia. The possibility of continuing problems could be inferred by carefully reading the Soviet press and local statistics shortly after the accident, but not from official sources.[62] However, the dangers continued to be downplayed in the USSR and to some extent in reporting by international organizations, despite a few attempts by the media to explore the problems. Then, in a speech presenting the 1989 economic plan, the chairman of the Belorussian Council of Ministers said that in the republic:

> Unfortunately, the negative consequences of this accident are not decreasing. The latest tests have shown that a considerably greater territory than previously thought is contaminated with radioactive fallout. Almost one-fifth of agricultural land is subject to various degrees of contamination. This calls for implementation of a series of urgent measures.[63]

Subsequent reports in early 1989 provided more information (including maps) on the localities most affected and the measures being taken in Belorussia. The republic accounts for about 5 percent of total Soviet agricultural production, including about 15 percent of potatoes and 6 percent of meat and milk.

One area in Gomel oblast, from which 4,400 people were evacuated, has been entirely abandoned.[64] In another area, 18,700 persons were evacuated, but apparently the area is still being cultivated. In other areas of Gomel and Mogilev oblasts, which include 103,000 people, agricultural production is also continuing, but food is brought in from outside. Another area, which includes 206,600 people, is under constant monitoring.

The Soviets are not explicitly saying what is being done with the farm products being produced in the contaminated areas. At the aggregate level, no disruption appears in food production. The presumption is that the products are being mixed with products from noncontaminated areas and consumed elsewhere in the USSR. Contaminated areas are also being treated in parts of Kiev, Zhitomir, Rovno, and Chernigov oblasts in the Ukraine and in the Bryansk oblast in the RSFSR. These areas account for about another 5 percent of Soviet agricultural production.

Dealing with the consequences of the accident has cost at least 8 billion rubles.[65] The expense is a major factor in the budget deficit and will likely remain so for many years. The half-life of cesium 137, one of the main contaminants, is 30 years. *(Kathryn Zeimetz)*

[62]Zeimetz, Kathryn, "Chernobyl and the Soviet Food Economy," paper presented at the 8th International Conference on Soviet and East European Agriculture. Berkeley, Calif., August 7-10, 1987.

[63]*Izvestiya*, 10/30/88, Morning edition, p. 2, translated in FBIS-SOV-88-216, 11/8/88.

[64]*Sel'skaya gazeta*, 2/9/89.

[65]Report by the USSR Minister of Finance in *Pravda*, First edition, 10/28/88, pp. 4-5, translated in FBIS-SOV-88-209, 10/28/88, pp. 52-62.

The Soviet land reclamation problems resulted because what should have been a comprehensive policy of 35-40 different irrigation and drainage measures was reduced in practice to a simplistic approach. The emphasis was on constructing new and rather simple large-scale irrigation systems in earthen channels. The channels contributed to filtration. Maintenance and repairs were ignored. Long delays occurred in constructing even the most primitive drainage networks.[59] One reason for low returns on improved land is the neglect of ecological soil-preserving factors. The yields on improved land have often been below planned outcome, and in some cases the programs have resulted in ecological disasters.

In the Northern Caucasus and the south of the Ukraine, the projected yields on irrigated land of 45-50 quintals of winter wheat per hectare are beyond the farms' reach. But these very same yields were attained on nonirrigated lands in the past during years of adequate precipitation. In the Non-Black Soil Zone, yields from the approximately 4 million hectares of reclaimed land are frequently no higher than from the unimproved land.[60] In 1971-86, the Non-Black Soil Zone lost one-third of irrigated and 37 percent of drained lands.

In the million-hectare area around the Aral Sea, mistakes in irrigation sharply increased the level of highly salinated underground water. Fields with secondary salinization must be flushed with water 3-4 times to be returned to production. About half the water in the irrigation systems is wasted.[61] Poor cultivation, irrigation, and drainage practices, together with the shrinking Aral Sea, have resulted in spreading desertification which now threatens this agricultural (mainly cotton-growing) region. In the last 10 years, there have been practically no increases in Central Asian agricultural output, and the production of cotton has decreased.
(Yuri Markish and Kenneth Gray)

[59]*Pravda*, 2/2/88.

[60]*Ibid.* and *Vestnik sel'skokhozyaistvennoi nauki*, No. 6 (1988), pp. 142-143.

[61]*Pravda vostoka*, 10/20/88.

Grain

Despite chronic shortfalls in meeting grain production targets, the Soviets are unrealistically calling for a record 241-million-ton grain crop in 1989. Grain output was short of plan by 21 million tons in 1987 and about 40 million in 1988, and is highly unlikely to approach the 1989 goal, even with ideal weather the remainder of this season (table 8).

Grain output targets of 250-255 million tons set for 1990, and 260-280 million for 1995, should prove even more unattainable. IT practices continue to be stressed as a primary means of reaching production targets, with grain area under the program planned to increase again in 1989. By 1990, intensive practices are planned to be applied to about 50 million hectares, including about 20 million of winter grains and about 30 million of spring grains. An additional 10 million hectares are to be under IT by 1995.

Production

Prospects for the 1989 winter grains appear good, similar to last year. The 1989 crop was sown on an estimated 34.5 million hectares, up an estimated 2 million hectares from the 1988 crop seeded in 1987. As a result of the mild winter and early spring, the 1988/89 winterkill of grains is estimated to be below the 18-19 percent estimated for 1985, 1986, and 1987, but above the near record low of around 10 percent last year. The Soviets reported that about 5 million hectares or an estimated 13 percent of all winter crops had to be overseeded or reseeded due to winterkill in 1989.

The USDA May 1989 production estimate was 210 million tons, up 15 million from last year, and area was placed at 115 million hectares, virtually unchanged from 1988. The forecast production increase reflected good winter grain yields and a rebound in spring grain yields from the drought-damaged 1988 yields. Wheat

Table 8--USSR: Grain production plans

Republic	1976-80	1981-85	1990	1995
		Million tons		
USSR	215-220	238-243	250-255	260-280
RSFSR	123-126	134-136	140-142	NA
Ukraine	46-48	51-52	52-54	NA
Kazakhstan	25-27	28-29	30-31	NA

production is estimated at 91.5 million tons, up 8 percent from 1988, and coarse grain output at 105.5 million tons, also up 8 percent.

Although 1988 grain output (in bunkerweight) fell 8 percent from 1987, it still exceeded the 1981-85 average by 8 percent (table 9 and figure 6). Largely because of drought in areas east of the Urals, the national yield declined 7 percent from 1987, to the lowest since 1985. But, this was still 14 percent above the 1981-85 average. Final grain area in 1988 declined for the eighth consecutive year, despite national plans to the contrary, and was the lowest since 1959. The 9-percent reduction in grain area since 1980 reflects a 10-percent rise in feed crop area and a 47-percent increase in clean summer fallow (figure 7).

The Soviets in 1988 reported a grain abandonment figure of about 5 million hectares, including over 3 million in

Figure 6

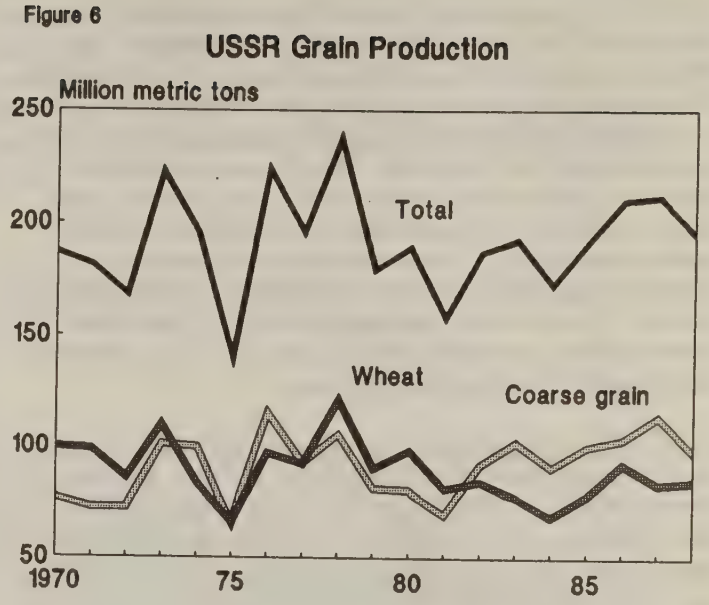
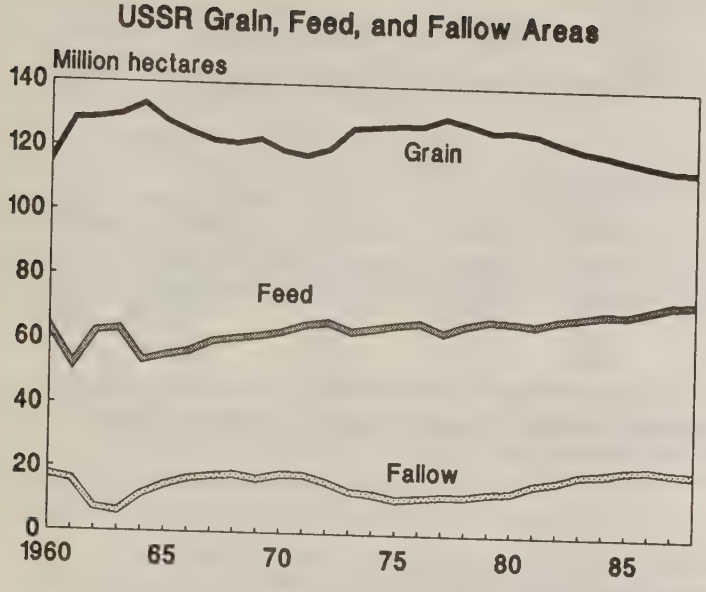


Table 9--Area, yield, and production of grain, USSR 1/

Year	Wheat 2/ Winter	Wheat 2/ Spring	Wheat 2/ Total	Rye	Barley	Oats	Corn	Other 3/	Total grain
					1,000 hectares				
Area									
1966-70 average	18,280	48,894	67,174	11,505	20,133	8,680	3,517	10,876	122,083
1971-75 average	18,443	43,025	61,468	8,500	28,370	11,310	3,596	10,743	123,987
1976-80 average	20,471	40,240	60,711	7,714	34,011	12,080	2,969	10,421	127,905
1981-85 average	18,709	35,023	53,732	9,331	30,530	12,352	4,000	11,441	121,386
1986	16,632	32,096	48,728	8,741	29,964	13,173	4,223	11,648	116,477
1987	15,319	31,365	46,684	9,725	30,654	11,790	4,573	11,786	115,212
1988	18,313	29,745	48,058	10,115	29,732	10,946	4,431	11,630	114,912
1989 4/	18,500	30,500	49,000	10,000	29,000	11,000	4,500	11,500	115,000
					Metric tons per hectare				
Yield 1/									
1966-70 average	1.96	1.11	1.34	1.12	1.50	1.38	2.72	1.16	1.37
1971-75 average	2.26	1.10	1.45	1.35	1.53	1.31	2.84	1.19	1.46
1976-80 average	2.48	1.22	1.64	1.41	1.62	1.42	3.22	1.21	1.60
1981-85 average	2.28	1.01	1.45	1.53	1.42	1.42	3.27	1.22	1.49
1986	2.80	1.43	1.89	1.76	1.80	1.66	2.95	1.22	1.80
1987	3.02	1.18	1.78	1.86	1.91	1.57	3.23	1.55	1.83
1988	2.98	1.01	1.76	1.83	1.50	1.40	3.62	1.40	1.70
1989 4/	2.95	1.21	1.87	1.80	1.79	1.55	3.44	1.39	1.83
					1,000 metric tons				
Production									
1966-70 average	35,888	54,304	90,192	12,834	30,454	11,938	9,558	12,585	167,561
1971-75 average	41,590	47,345	88,935	11,493	43,289	14,812	10,215	12,810	181,554
1976-80 average	50,725	48,948	99,673	10,880	55,150	17,161	9,568	12,595	205,027
1981-85 average	42,726	35,204	77,930	14,280	43,480	17,540	13,080	14,001	180,311
1986	46,528	45,778	92,306	15,248	53,889	21,929	12,479	14,217	210,068
1987	46,237	37,075	83,312	18,055	58,409	18,495	14,808	18,286	211,365
1988	54,495	29,950	84,445	18,517	44,463	15,287	16,030	16,317	195,059
1989 4/	54,500	37,000	91,500	18,000	52,000	17,000	15,500	16,000	210,000

1/ Some figures may not add or calculate because of rounding. 2/ Production data for winter wheat and spring wheat derived from official area and yield data for 1981-85. 3/ Includes millet, buckwheat, rice, pulses, and miscellaneous grains. 4/ USDA May 1988 forecast.

Figure 7



the RSFSR and more than 1.5 million in Kazakhstan. This is slightly above the 3-4 million hectares which is believed to be average. While the drought through parts of the Volga Valley, the Ural region, West Siberia, and northern Kazakhstan accounted for part of the reduced grain crop and the abandonment of grain areas, it was also a factor in the improvement of grain quality in 1988.

Wheat production rose only 1 percent in 1988 despite a 3-percent rebound in area from 1987. The 1987 area was the lowest since at least 1955. The unusually dry summer weather in many of the spring wheat areas hampered yields, but it also improved the protein content of the 1988 crop from the poor-quality 1987 harvest. Procurements of quality wheat were up by about 4 million tons in 1988 (table 10).[66]

Coarse grain output fell 14 percent in 1988, because of lower yields and a 3-percent decline in area, to the smallest in 15 years. Spring barley accounted for most of the drop in area, because of drought and the reduced winter grain area reseeded with barley. The sharp decline in 1988 spring barley production, down over a quarter from 1987, more than offset the rise in corn for grain output, at the second highest ever. Increased corn output resulted from higher yields; area was steady (figure 8).

Procurements

The share of grain production procured by the State dropped for the third consecutive year in 1988, to the lowest since 1965, when the share was 30 percent. Total grain procurements in 1988 are estimated at only 60 million tons, 18 percent below 1987 and 10 percent below the 1981-85 average (table 11). Moreover, 1988 grain

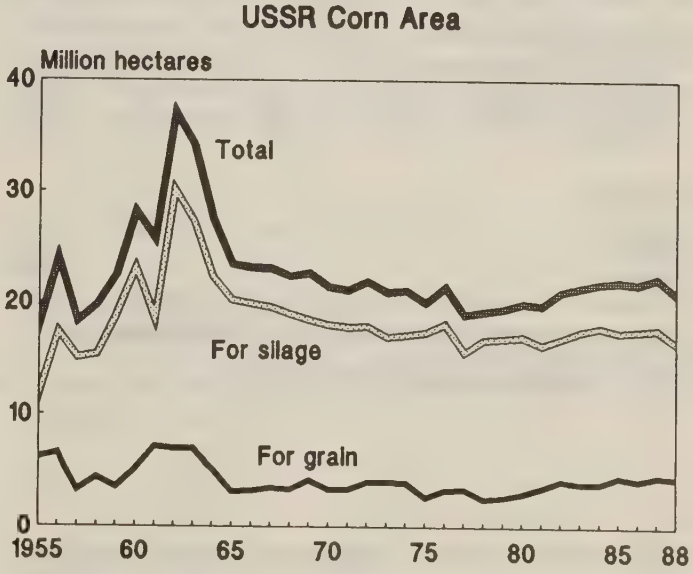
[66]*Sel'skaya zhizn'*, 11/18/88.

Table 10--USSR: Wheat production and procurements

Grain	Production	Procurements
	1,000 metric tons	
Wheat		
1976-80 average	99,673	47,932
1980	98,182	46,464
1981	81,112	37,016
1982	84,265	36,741
1983	77,519	34,099
1984	68,633	25,500
1985	78,138	35,065
1986	92,306	43,823
1987	83,312	35,178
1988	84,445	NA
Durum		
1976-80 average	NA	1,816
1980	NA	1,326
1981	NA	510
1982	NA	899
1983	NA	1,295
1984	NA	276
1985	NA	1,233
1986	NA	2,553
1987	NA	1,008
1988	NA	NA
Hard (silnaya)		
1976-80 average	NA	7,392
1980	NA	6,269
1981	NA	8,045
1982	NA	5,324
1983	NA	3,778
1984	NA	3,722
1985	NA	6,870
1986	NA	10,990
1987	NA	7,195
1988	NA	NA

Source: Sel'skoe khozyaistvo SSSR, 1988.

Figure 8



procurements were 25.6 million tons short of plan for the country.[67] Reportedly, procurement plans for wheat were already short by 15.6 million tons, including 2.7 million tons of durum, in 1986-87, reflecting the diminishing interest in selling grain to the State.[68]

[67]*Pravda*, 2/8/89.

[68]*Izvestiya*, 6/26/88.

Table 11--USSR production and State purchases of grains by major republics

Region	1976-80 average		1981-85 average		1986		1987		1988 1/	
	Prod.	Purch.	Prod.	Purch.	Prod.	Purch.	Prod.	Purch.	Prod.	Purch.
	Million metric tons									
USSR	205.0	77.7	180.3	66.6	210.1	78.8	211.4	73.3	195.0	2/ 60
RSFSR	113.9	42.4	98.9	35.0	118.0	42.1	109.0	35.0	102.8	NA
Ukraine	43.2	14.0	39.3	13.4	43.1	15.2	50.2	18.1	47.4	NA
Kazakhstan	27.5	16.3	21.3	12.6	28.3	16.7	27.4	14.6	22.6	NA
Byelorussia	6.2	1.3	6.2	2.0	7.0	1.6	9.3	2.0	NA	NA
Baltic republics	5.1	0.7	5.5	0.9	6.2	1.0	6.9	1.0	NA	NA

NA = not available. 1/ Preliminary data from 1988 USSR and republic plan fulfillment reports. 2/ ERS estimate.
Sources: Narodnoe khozyaistvo, 1988 and Vestnik statistiki, various issues.

In another attempt to reverse the trend of smaller and lower quality grain sales to the State, particularly of wheat, grain procurement price bonuses were raised sharply, effective with the 1988 harvest. Quality bonuses for wheat were raised to as much as 100 percent of the base price and to as much as 150 percent for first class durum wheat (tables 12 and 13). In addition, the quantity bonus for sales of all classes of wheat in excess of the 1986-90 plan targets (regardless of quality) was raised from 100 percent to 150 percent. (Under the current 5-year plan, annual sales targets are to be held constant so as to provide greater incentive to strive for above-plan sales.)

Table 12--USSR: Quality bonuses for wheat

Grade classification	Pre-1988	1988
	Bonus as percent of base price	
Wheat (excluding durum)		
Super class (gluten +40 percent) 1/	--	100
Class I "silnaya"	50	75
Class II "silnaya"	30	50
"Tsenaya"	10	30
Durum wheat		
Class I	100	150
Class II	70	100
Class III	20	50

1/ This class was apparently established as part of the 1988 bonus increases.
Source: Sel'skaya zhizn', June 24, 1988.

Table 13--USSR: Quantity bonuses for all wheat classes

Bonus criteria	Pre-1988	1988 1/
	Bonus as a percent of base price	
Above 1981-85 average	50	50
Above 1986-90 plan average	100	150

1/ Effective with the 1988 harvest.
Source: Sel'skaya zhizn', June 24, 1988.

The base price paid to farms for non-durum wheat remains at 105 rubles per ton. However, now farms can qualify for payments as high as 525 rubles per ton. This is nearly 70 percent higher than the top price under the old bonus system. (The national base price of 105 rubles per ton varies by price zone, so the entire scale would be lower in a region such as the Ukraine with a base price of 97 rubles and higher in Belorussia with a base price of 130 rubles.) The base price of durum wheat, 150 rubles per ton, is unchanged, but higher bonuses mean farms are eligible for payments as high as 938 rubles, versus 600 rubles under the old bonus scheme. (Prices for durum do not vary by region.) Procurement price bonuses were also increased for top grades of buckwheat, rice, oats, millet, barley, and pulses.

Funds for the higher bonuses will reportedly come partly from budgetary savings elsewhere in the agroindustrial complex. One of the cost-cutting measures was the elimination of State subsidies on raw materials used in mixed feed production. As a result, State mixed feed prices for State and collective farms were raised by 20-25 percent last year. Reportedly, 2.6 billion rubles were added to the Government procurement fund in 1988 to cover the cost of the increased bonuses for grain quantity and quality.[69] One report indicates that in 1986, 6.2 billion rubles were allocated to subsidize retail prices of grains and oilseeds.[70]

Several factors may account for the continued drop in grain sales to the State in 1988 despite the dramatic increase in procurement bonuses. The ability to sell less grain and still earn the same amount of rubles because of the new bonuses may be prompting farms to keep more

[69] *Sel'skaya zhizn'*, 1/12/89.

[70] *Financy SSSR*, No. 9 (1988).

grain. Furthermore, last year's substantial price increase for mixed feeds may also be motivating farms to retain more grain for feeding, rather than selling it to the State, and then having to repurchase it as poor-quality and expensive mixed feed. For example, a farm in the Ukraine can sell its grain for 97 rubles, but must pay roughly 150 rubles for mixed feed. For a Belorussian farm, grain may be sold for 130 rubles and the price for mixed feed is the same 150 rubles. Higher procurement bonuses, which are financed in part through higher mixed feed prices, likely will increase incentives to keep grain on the farm.

The opportunity to raise profits through increased grain sales to the Government may not motivate farms, given the few goods to buy with the additional income. Moreover, the State in many cases cannot even meet agreements to exchange grain directly for input supplies.

Some Soviets suggest that falling grain procurements represent a policy goal to procure only the highest quality grains for use as food and leave the business of producing mixed feed to enterprises on the farm level. However, there are a number of reasons to believe the State will not abandon its role in mixed feed production. The State mixed feed industry has its own priorities and interests, which include maintaining production at least at achieved levels. Without truly radical economic reform, this will continue to be so. If extra grain is being kept on the farm, this may be occurring in grain-surplus regions such as the New Lands and the south European USSR. This would still leave important livestock producing regions, particularly the Non-Black Soil Zone, as dependent on State grain as before. In addition, given the commitment to increasing livestock production, particularly meat, the State likely would not reduce its use of grain.

Production Costs

The partial elimination of subsidies on agricultural inputs in 1988 likely raised the national average prime costs (sebestoimost') of producing grain, although some reports indicate that overall farm costs of production declined (table 14). The increase in the per ton grain production costs also resulted from the decline in yields. The cost increase in 1988 came after 5 years of relatively stable costs for the USSR as a whole, during which higher costs per hectare were offset by increased yields. In fact, in the Ukraine and Kazakhstan, production costs per ton have decreased since IT was introduced in 1985. Unless yields can offset the increased costs per hectare associated with the substantial rise in input prices, the appeal of IT to farmers may weaken, particularly since one objective of the program is to reduce costs per ton. It is uncertain to what degree higher procurement prices will maintain interest in IT.

Intensive Technology

The Soviet IT program is nothing more than the adoption of various agronomic and technical practices long standard in Western countries. Some of these practices are: (1) greater use and more timely and scientific application of higher quality fertilizers, (2) supplementation of fertilizers with appropriate plant growth regulators, insecticides, fungicides, and herbicides, (3) development and widespread use of higher yielding and quality seeds resistant to drought, extreme cold, and lodging, (4) introduction of more efficient and specialized equipment operated by a greater trained workforce, and (5) practices to conserve moisture supplies and the organic content of soils, placing heavy emphasis on fallow, snow retention efforts, reducing soil compaction,

Table 14--Cost of producing grain (excluding corn) on Soviet farms 1/

Farm type	1976-80 average	1980	1981	1984	1981-85 average	1985	1986	1987
				Rubles per ton				
USSR								
State	77	84	91	112	102	113	109	112
Collective	68	76	81	92	86	94	91	92
RSFSR								
State	NA	87	NA	NA	108	113	111	118
Collective	NA	80	NA	NA	95	98	95	102
Ukraine								
State	NA	61	NA	NA	NA	83	80	77
Collective	NA	59	NA	NA	NA	74	73	68
Kazakhstan								
State	76	76	NA	NA	95	110	103	103
Collective	69	71	NA	NA	89	100	94	88
Byelorussia								
State	NA	116	NA	NA	NA	NA	128	116
Collective	NA	113	NA	NA	NA	NA	118	107

1/ The costs do not include charges for land and fixed capital and thus understate true costs.
Sources: Narodnoe khozyaistvo, various years, and N. N. Krasavin, Effektivnost' zatrat v sel'skom khozyaistve, Moscow, 1986.

and proper crop rotation. Often areas designated as part of the IT program only practice one of the recommended measures, so IT in one region may mean something different from IT elsewhere. For example, IT in Kazakhstan has been primarily the increased use of fallow, not greater use of fertilizers.

The impact of IT on grain production and quality in 1988 appears to be small despite the reported expansion of the program to about 39 million hectares, up over 3 million from 1987. IT on winter grains in 1988 reportedly rose about 4 million hectares to roughly 17 million, and on spring grains it was about the same as 1987's 22 million. The Soviets admit that despite the rise in area, IT yields are "less than their inherent potential," largely because of continuing quality-input shortages and distribution problems.[71]

The expansion of IT practices on winter grains accounted for the bulk of the total growth in intensive grain practices in 1988. The RSFSR accounted for about three-quarters of the roughly 30-percent increase in winter grain IT area, the Ukraine about a quarter (figure 9). Intensive practices on spring grains expanded only marginally in all republics (figure 10).

The most obvious examples of the increased intensification of grain production in the USSR include the rising use of fertilizers and clean summer fallow to stabilize and raise yields. However, the national use of fertilizers was unchanged in 1988. Fertilizer subsidies were eliminated in regions accounting for about 60 percent of the farmland. Use of fertilizers declined in the Ukraine and Kazakhstan by 2 and 3 percent, but increased 1 percent in the RSFSR. The elimination of the subsidies for the remaining farms in 1989 may cut fertilizer use.

In 1987, fertilizer applications to small grains in the USSR grew 3 percent; applications rose as much as 7 percent and 8 percent in Belorussia and the Ukraine (figure 11). Application of fertilizers on small grains in 1987 was unchanged in Kazakhstan, an arid area. In the RSFSR, applications rose 4 percent. After increasing 13 percent in 1986, fertilizer application on corn fell 8 percent for the country as a whole in 1987.

The share of small grain area in the USSR receiving fertilizer applications increased 1 percent in 1988 (figure 12). Although for the country as a whole the share of area fertilized rose slightly, it declined in the Ukraine and Kazakhstan in 1988. The area shares in the RSFSR rose 3 percent. In 1987, the share had fallen for the first time in 8 years.

Fallow area in 1988 fell for the second year, down 3 percent to 20.4 million hectares (figure 13). However,

[71]*Pravda*, 2/8/89, translated in FBIS-SOV-89-050, 3/16/89, p. 86.

Figure 9

USSR Winter Grains Under IT

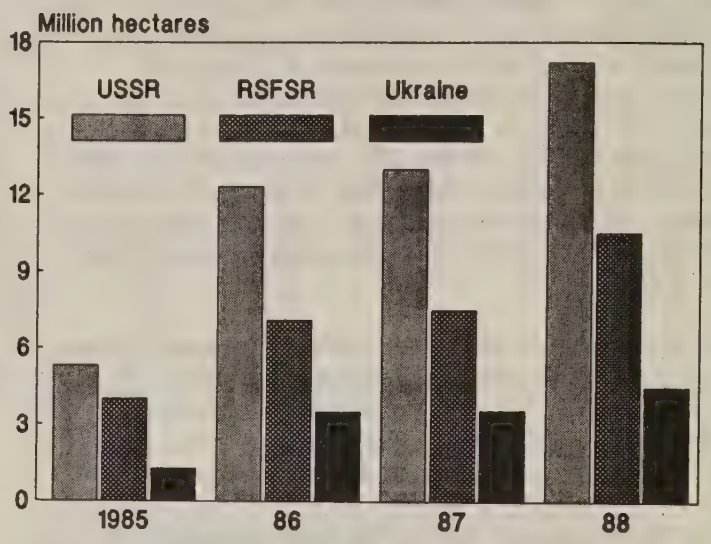


Figure 10

USSR Spring Grains Under IT

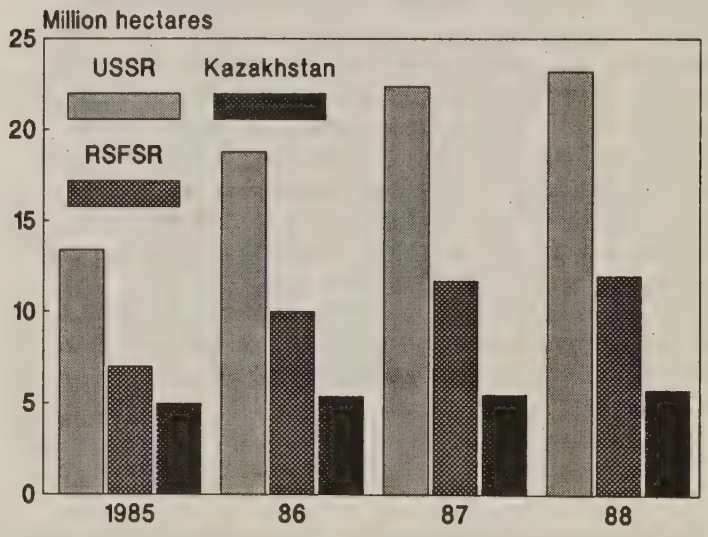


Figure 11

USSR Fertilizer Use on Small Grains

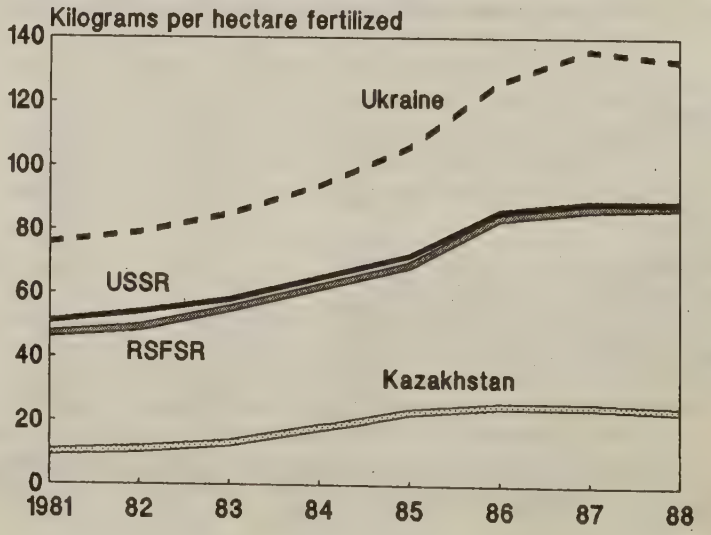


Figure 12

USSR Small Grain Area Fertilized

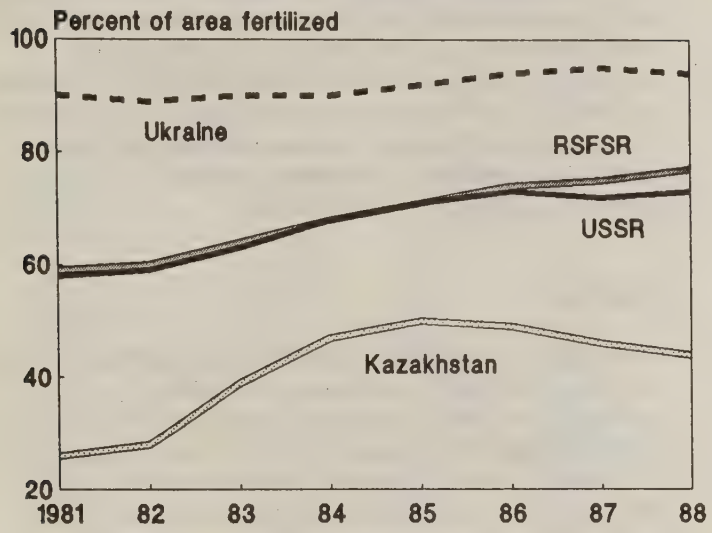
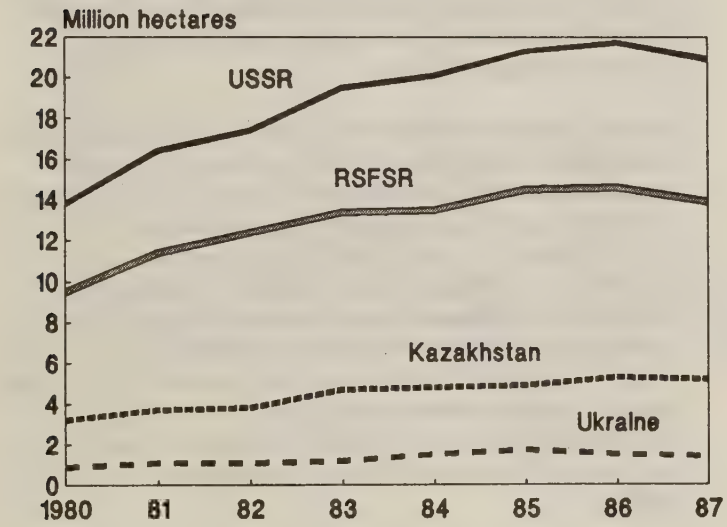


Figure 13

USSR Clean Summer Fallow



1988 total fallow area is still nearly 50 percent above 1980's 13.8 million hectares and in line with the policy to maintain fallow at 20-22 million hectares.

The Soviet method for measuring IT gains is questionable. The Soviets apparently do not compare yields on IT area with the yields on the same land before the introduction of IT, but with areas not chosen for IT. In 1987, the average countrywide yield for winter grains under IT reportedly increased 4 percent over 1986, compared with 14 percent in 1986 over 1985. Non-intensive winter grains reportedly rose 3 percent in 1987. The average yield for spring wheat under IT decreased 17 percent in 1987 from 1986, the same decline as for spring wheat under normal practices.

For the country as a whole, the average yield of winter grain under intensive practices in 1987 was reportedly 63 percent above the yield of winter grains raised under normal methods. In 1986 the difference between the two was 61 percent. The difference in winter grain yields in 1987 was 48 percent in the RSFSR, but nearly 70 percent in Belorussia.

Spring wheat yields in 1987 were reportedly 47 percent higher on intensive fields (likely areas previously fallow) than on nonintensive fields. In 1986 the intensive spring wheat yields were also 47 percent greater. Spring wheat yields under IT in 1987 were only 35 percent more than other yields in the RSFSR, although the difference exceeded 60 percent in Kazakhstan. *(Christian J. Foster)*

Grain Losses

The USSR again reported production in bunkerweight in 1988 (bunkerweight includes excess moisture, and foreign materials or dockage such as weeds, soil, and pebbles). Pressure continues to mount, though, to change over to grain output accounting on a clean weight basis. The Soviets claim the delay in converting to a clean weight basis is due partly to the lack of necessary measuring equipment at the farm level.[72]

The Soviet newspaper *Literaturnaya gazeta* (5/11/88) emphasized that "the time has come for the leaders of the agroindustrial complex to restructure this strange procedure...and to stop deceiving both themselves and us." The paper directly questioned the accuracy of 1987's published production figure and cited examples where the difference between bunkerweight and clean weight was as much as 30 percent.[73]

General Secretary Gorbachev stated: "Our losses in grain harvesting and pre-storage treatment amount to 15 and even 20 million tons. About as much is lost in storage and processing. In all, ...the losses equal our purchases abroad."[74] According to Soviet economist Nikolai Shmelev, "every year we [the USSR] lose as much as 25 percent of our grain" to poor harvesting practices, bad processing, storage and transport (FBIS 11/10/88). Total grain losses in the Ukraine are placed at about 20 percent and in Belorussia at 30 percent.[75] An official with Gosagroprom reports that losses have averaged 7-10 percent of bunkerweight in recent years, and a Gosagroprom publication indicates excess moisture and dockage (excluding waste) in State procurements averaged 3.8 percent in 1980-87.[76] Furthermore, Gosagroprom announced in August that countrywide

[72]*Literaturnaya gazeta*, 8/10/88.

[73]*Literaturnaya gazeta*, 5/11/88.

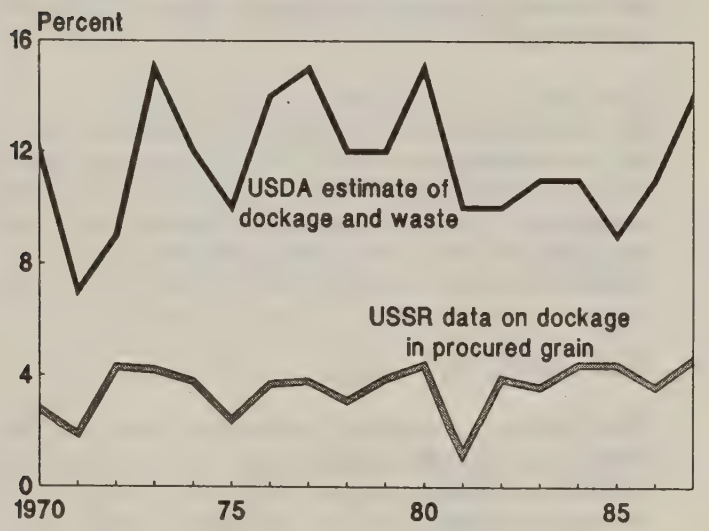
[74]Moscow Domestic Television, 3/15/89, translated in FBIS, 3/16/89.

[75]*Pravda Ukrainy*, 6/15/88; *Voprosy ekonomiki*, No. 8 (1988).

[76]*Literaturnaya gazeta*, 8/10/88; *Sel'skoe khozyaistvo SSSR*, 1988.

Figure 14

USSR Grain Dockage and Waste



aggregate figures on production in clean weight would be available in May 1989.[77]

USDA estimates above-average moisture and trash in Soviet grain output as well as excess waste and losses during shipping and handling. Grain losses associated with harvesting and grain imports are not accounted for in USDA estimates. USDA estimates 1988/89 dockage and waste at 11 percent or 22 million tons. The estimate largely reflects the reduced total grain output, greater care in handling and the dry harvesting conditions last season. The estimate for the large 1987 crop harvested under unusually wet conditions was 14 percent, or 30 million tons (figure 14).

Drying and Harvesting Equipment

The lack of drying facilities partly accounts for excess moisture in Soviet grain crops. Moreover, even under dry weather conditions, the short growing season in the Siberian regions often does not permit plants to dry out fully before harvest. Reportedly, the capacity of facilities to dry grain in some major spring wheat areas is as low as 20 percent in Kurgan oblast, 8.6 percent in Altai krai, 4.5 percent in North Kazakhstan oblast, 1.8 percent in Kustanai oblast, 1.2 percent in Kokchetav oblast, and 0.03 percent in Turgai oblast.[78]

Even before the crop is gathered, substantial losses occur in the field, mainly due to protracted harvesting operations, the poor condition of machinery, and inefficient use of labor. One authority states that each year 60-80 million hectares of grain are not harvested quickly enough, resulting in losses of 17-20 million tons valued at 2.5 billion rubles.[79] Another source notes that if the time for harvesting could be cut by 7-10 days, yields could be increased by 0.3-0.4 tons per hectare. If applied to all grain areas in the country the faster harvest reportedly could produce an additional 30-40 million tons annually.[80] The Ukraine reportedly loses 3.5-6.0 million tons each year because of protracted and inefficient harvesting operations. Instead of taking 10-12 days, harvesting often takes 25-30 days.[81]

Feed Use

Domestic use of grain for feed is estimated by the USDA at a record high 135 million tons in 1988/89, up 13 percent from 1980/81 (table 15 and figure 15). The continued growth in grain fed reflects the priority placed on raising output of livestock products and improving feed rations, with emphasis on increased animal productivity rather than expanded inventories.

The share of grain in mixed feeds produced by the State was reportedly 68.4 percent in 1988, up 31 percent from 1968.[82] The Soviets compare this with the grain share in mixed feeds in the United States and Western Europe, which is around 45 percent.

The discrepancy between the USSR and the West is due to the lack of high-protein feeds, other additives, and byproducts of the food industry. Oilseed meal reportedly comprises only 9 percent of Soviet mixed feeds. The share of oilmeal in the United States and Western Europe is reportedly over 25 percent. The protein shortage in the livestock sector is cited by many Soviets at about 10-15 percent of recommended norms, or a deficit of about 5-7 million tons of protein (10-15 million tons in a soybean meal equivalent).[83] Reportedly, one-third of Soviet poultry feed production, one-third of hog feed, and one-half of cattle feed output is deficient in protein.[84]

Soviet specialists report that at least 50, perhaps 60 million tons of the total grain used for feed in the socialized sector is fed unprocessed or just coarsely ground. They estimate that if feeds were properly balanced with oilmeals and other additives, grain use could be reduced annually by 16-18 million tons. Other sources cite overuse of grain at 20-30 million tons. The Soviets note that improving mixed feed rations alone could raise feeding efficiencies by 10-15 percent and

[77] *Literaturnaya gazeta*, 8/10/88.

[78] *Sel'skaya zhizn'*, 7/20/88.

[79] *Planovoe khozyaistvo*, No. 11 (1988).

[80] *Planovoe khozyaistvo*, No. 5 (1988).

[81] *Ekonomicheskaya gazeta*, No. 39 (1988).

[82] *Vestnik agroproma*, Nos. 30, 36, and 47 (1988).

[83] *Vestnik sel'skokhozyaistvennoi nauki*, No. 6 (1982).

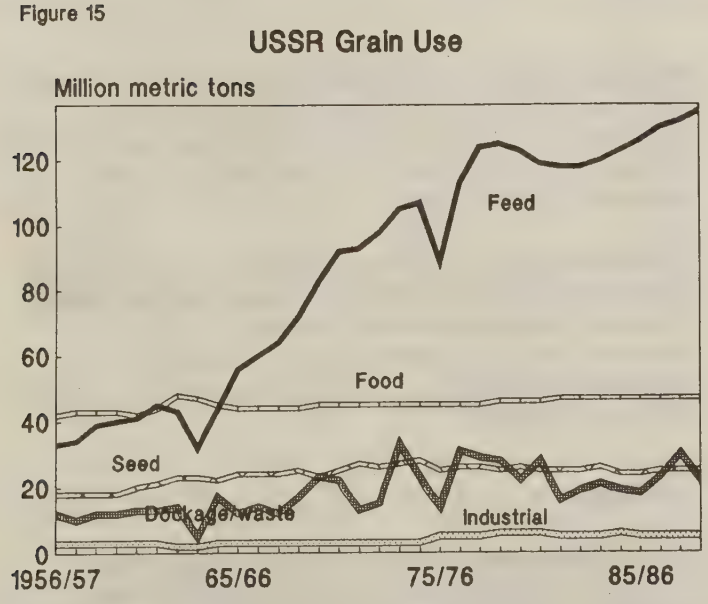
[84] *Pravda*, 5/13/88.

Table 15--Supply and use of grain, USSR 1/

Year beginning July 1	Production 2/	Trade		Availability	Utilization						
		Imports	Exports		Seed	Industrial	Food	Dockage-waste	Feed	Total	Stock change 3/
				Million metric tons							
Total grains 4/											
1981/82	158.2	47.3	0.5	205	25	5	47	16	118	211	-6
1982/83	186.8	34.3	0.5	221	25	5	47	19	118	214	+7
1983/84	192.2	32.5	0.5	224	26	5	47	21	120	218	+6
1984/85	172.6	55.5	0.5	228	24	6	47	19	123	219	+9
1985/86	191.7	29.9	0.5	221	24	5	47	18	126	220	+1
1986/87	210.1	27.5	0.5	237	25	5	47	23	130	230	+7
1987/88	211.4	32.0	0.5	243	25	5	47	30	132	239	+4
1988/89	195.0	38.5	0.5	233	25	5	48	22	135	235	-2
1989/90 5/	210.0	33.0	1.0	242	25	5	48	24	140	242	0
Wheat											
1981/82	81.1	20.3	0.5	101	11	2	36	8	47	104	-3
1982/83	84.3	20.8	0.5	105	11	2	36	9	43	101	+4
1983/84	77.5	20.5	0.5	98	11	2	36	9	35	93	+4
1984/85	68.6	28.1	0.5	96	11	2	36	8	35	91	+5
1985/86	78.1	15.7	0.5	93	11	1	36	8	36	92	+1
1986/87	92.3	16.0	0.5	108	11	1	36	10	45	103	+5
1987/88	83.3	21.5	0.5	104	11	1	36	13	40	101	+3
1988/89	84.4	15.0	0.5	99	11	1	37	10	42	101	-2
1989/90 5/	91.5	12.0	1.0	102	11	1	37	10	44	102	0
Coarse grains 6/											
1981/82	69.3	26.0	0	95	13	3	7	7	68	98	-3
1982/83	91.8	12.5	0	104	13	3	7	9	69	101	+3
1983/84	101.9	11.5	0	113	13	3	7	11	78	112	+2
1984/85	90.5	26.9	0	117	12	4	7	10	81	114	+4
1985/86	100.0	13.7	0	114	12	4	7	9	82	114	0
1986/87	105.9	11.0	0	117	13	4	7	11	80	115	+2
1987/88	113.7	10.0	0	124	13	4	7	15	84	123	+1
1988/89	97.5	23.0	0	120	13	4	7	11	85	120	0
1989/90 5/	105.5	20.0	0	126	13	4	7	12	90	126	0

1/ All are USDA estimates and forecasts except production 1981-88. Rounded to the nearest million tons, except for production and trade data. Totals may not add because of rounding. 2/ Calendar year basis. 3/ Difference between availability and total use. 4/ Includes wheat, coarse grains, buckwheat, rice, pulses, and miscellaneous grains. 5/ USDA May 1989 forecast. 6/ Includes rye, barley, oats, corn, and millet.

Figure 15



increase meat output by at least 2 million tons annually.[85] Moreover, improved feed rations reportedly could free up a significant amount of high-quality wheat for food use. The USDA estimates feed use of wheat in 1988/89 at 42 million tons, including by Soviet estimate 8-10 million tons of high-quality wheat.[86]

Grain Handling

Better use of the grain procured and imported by the State could reduce grain losses incurred during shipping

[85]*Vestnik agroproma*, Nos. 30, 36, and 47 (1988); *APK Rossii*, No. 4 (1988); *Kombikormovaya promyshlennost'*, Nos. 2 and 4 (1988); and *Pravda*, 5/13/88.

[86]*Khleboprodukty*, No. 8 (1988); *Izvestiya*, 6/26/88.

and lessen the burden on the rural infrastructure. Each ton of grain purchased by the State reportedly traveled 1,144 kilometers on Soviet roads in 1987. The bulk of the grain, 64 million tons (about 60 percent of the State's purchases and imports in 1987), was delivered to farms as either ground grain or mixed feed.[87] *Pravda* (12/5/88) reports that from January 1987 through August 1988 losses incurred in the handling of imported grain amounted to over 30 million rubles (277,600 tons), likely an understatement. Moreover, losses of imported grain during shipment by train alone during January 1987-August 1988 reportedly totaled 3 million rubles (about 30,000 tons), also likely an underestimate.[88]

Food and Industrial Use

USDA estimates 1988/89 industrial use of grain unchanged from 1987/88's 5 million tons. Although production of alcohol from grain in 1988/89 should increase, the use of grain in nonalcoholic beverages should fall. Output of vodka in 1987 fell 16 percent from 1986, to its lowest in 31 years, reflecting the now reconsidered 1985 strategy aimed at curbing alcohol consumption (figure 16). Production of beer in 1987, although up slightly from the year earlier, was still 22 percent below 1981-85 average of 650 million decaliters. While Government output of liquor products declined sharply following the start of the anti-alcohol campaign, the use of grain in the production of nonalcoholic beverages increased. Grain accounted for the largest share--26 percent--of the ingredients used in nonalcoholic beverage output in 1987.[89] This is returning to the previous production relationship.

Seed use of grains in 1988/89 is estimated to comprise 13 percent (25 million tons) of total Soviet grain production. Wheat seed use is estimated at about 13 percent of Soviet wheat production, compared to about 4 percent in the United States in 1986/87. This can be explained by the sharp difference in seeding rates between the two countries. The high Soviet rate is due, in part, to poor tillering properties of Soviet seed varieties and to different climatic conditions. The recommended seeding rate for winter wheat in the USSR is about 240 kilograms per hectare, more than triple the U.S. rate of about 75 kilograms per hectare. Recommended Soviet seeding rates for spring wheat, barley, oats, and rye are at least double U.S. rates.[90]

Reduced per capita food consumption of grain in the USSR continues largely to offset population growth, keeping total food use of grain fairly stable (figure 17).

[87]*Pravda*, 9/8/88.

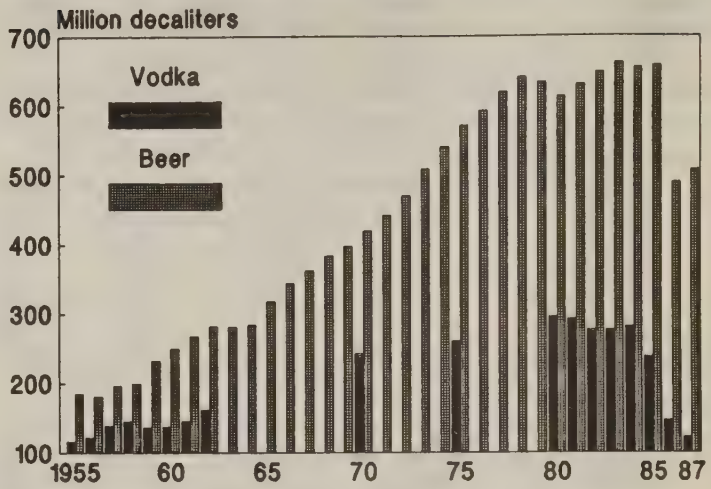
[88]*Pravda*, 12/5/88.

[89]*Pishchevaya promyshlennost'*, No. 3 (1988).

[90]*Zernovoe khozyaistvo*, No. 2 (1984).

Figure 16

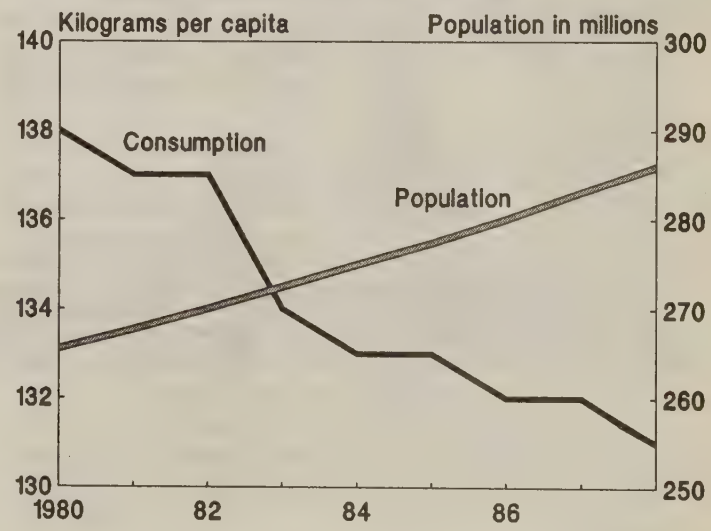
USSR Vodka and Beer Production*



*Vodka data unavailable for some years.

Figure 17

USSR Food Grain Use



While the population increased 6 percent from 1980 to 1987, per capita consumption of grain (in a flour equivalent) declined 4 percent. USDA estimates 1988/89 food use of all grains at 48 million tons, and food use of wheat at 37 million tons.

USDA estimates a drawdown in Soviet grain stocks in 1988/89, the first since 1981/82, because of the reduced crop and increased feed use. Grain reserves are estimated down by 2 million tons to balance the estimated total grain use of 234 million tons. *(Christian J. Foster)*

Livestock

In 1989 the Soviet livestock sector faces important challenges. For the first time since 1982, total feed supplies are smaller than the previous year. Livestock

inventories, which have declined slightly in the last 2 years, likely will have to be stabilized in 1989. This will have a negative impact on maintaining recent growth rates in meat production. Given deepening problems associated with consumer demand and market shortages, significant growth in livestock production is becoming increasingly important for the success of the entire economic reform effort in the USSR.

The prospects for livestock growth in 1989 are not particularly bright. Without major improvements in feeding efficiency and animal productivity, growth greater than 2 percent would appear difficult to achieve. Table 16 provides measures of livestock output growth on a calendar year basis and feed supplies on a July-June year since 1985.

Table 16--Livestock sector and feed supply measures

Category	1985	1986	1987	1988	1989
			Percent		
Livestock sector growth					
Official Soviet 1/	1.0	4.7	1.2	3.4	--
CPE Branch 2/	-0.4	6.4	0.3	2.6	2.0
Feed supplies 3/	0.9	2.9	1.0	3.6	-1.1

1/ Gross value of livestock production in 1983 prices, as reported in Narodnoe khozyaistvo SSSR.
2/ Estimated by the CPE Branch based on meat output by type, production of eggs, milk, and wool, and inventory changes in estimated 1985 prices. 3/ July-June years. 1984/85 feed supplies are listed under 1985, etc. From table 17.

Feed Supplies

Estimated feed availability for the 1988/89 July-June year was down by about 1 percent from the previous year (table 17). Smaller availability of silage, straw, and dehydrated alfalfa meal and an exceptionally small potato crop accounted for the decline. Grain feeding in 1988/89 increased an estimated 3 million tons. Because of a small decline in animal inventories, feed per standard animal unit remains very close to the record 2.95 tons of 1987/88.

The decline in feed supplies is counterbalanced by the reportedly higher quality of roughage feeds this year[91] and the unusually mild winter weather in the European USSR, which reduced maintenance requirements.

[91]Moscow Domestic Service, 1100 GMT, 8/31/88, translated in FBIS-SOV-88-171, 9/2/88, p. 58.

Feed Quality

Thanks to large investment in storage and processing, the quality of roughage feeds in the USSR (primarily silage, hay, and haylage) has increased slowly but steadily during the 1980's. Table 18 provides data on increases in roughage feed processing. Between 1980 and 1987, storage capacity for silage and haylage crops increased by over 80 percent, storage capacity for hay nearly tripled, and storage capacity for feed roots quadrupled.

Progress has been much less evident in overcoming the other primary feed problem--the shortage of protein and the general low quality of Soviet mixed feeds. Oilseed production has increased and area sown to high-protein

Table 17--Soviet feed supplies by type in oat-unit equivalent, January 1 standard animal units, and feed per standard animal unit

Units	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88 1/	1988/89 1/
					Million metric tons					
Total feed	391.5	395.5	384.9	412.9	425.0	428.9	441.3	445.6	461.7	456.7
Coarse 2/	76.4	82.4	80.2	86.2	93.7	88.4	96.3	94.1	98.9	98.8
Pasture	61.7	61.2	61.4	62.6	64.0	63.8	64.1	63.4	61.3	62.9
Succulents 3/	83.9	85.9	78.3	98.1	100.8	106.6	105.5	106.5	116.6	107.5
Concentrates 4/	169.5	166.0	165.1	166.0	166.6	170.6	175.3	181.7	184.9	188.0
					Million units					
January 1 total animal units 5/	148.7	149.4	150.8	153.4	156.3	157.0	156.9	158.3	156.5	155.6
					Tons					
Feed per standard animal unit	2.63	2.65	2.55	2.69	2.72	2.73	2.81	2.81	2.95	2.94

1/ Preliminary. Totals may not add because of rounding. 2/ Includes hay, haylage, and straw. 3/ Includes silage, green chop, potatoes, feed roots, melons, and beet pulp. 4/ Includes grain, millfeeds, oilmeal, fish and animal meal, grass meal, feed yeasts, and whole and skim milk. 5/ In terms of cows, conversion ratios as follows: Cattle (other than cows) 0.6, hogs 0.3, total sheep and goats 0.1, horses 1.0, and poultry 0.02.

Table 18--Roughage feed processing

Type	1980	1985	1987
	Million tons		
Pressed hay	10.7	18.5	20.5
Hay dried with artificial ventilation	3.3	7.8	8.3
Silage preserved with chemicals	26.0	67.9	79.7

roughage crops is also up. Production of feed pulses has also increased, but in all areas the achievements are well short of what is required to redress the shortage of protein in Soviet feed rations. Protein supplies remain roughly 10-15 percent short of requirements. As a result, imports of oilseeds and oilseed meal have picked up in recent years, but remain well short of requirements.

Partly because of protein shortages, the quality of mixed feed from the State industry remains well below specifications and is a major source of complaint among livestock producers in the USSR. As an indication of the problem, oilmeal accounts for only 9 percent of mixed feed ingredients, roughly unchanged since the early 1960's,[92] and well below the share in Western countries. Fish and animal meals contribute only an additional 2 percent.

Another problem with mixed feed supplies concerns the pricing system. Whereas the prices farms receive for grain vary widely by region, prices for mixed feed do not. For this reason, farms in high-cost areas have more reason to trade grain to the State for mixed feed than those in areas where grain prices are low.

Intensification

The strategy in the livestock sector focuses on achieving growth through greater output per head, and on improvements in production efficiency. This approach makes sense considering that the average daily rate of gain for Soviet cattle and hogs is only about 50-60 percent of the U.S. level and that Soviet milk yields are less than half those in the United States.[93] Improvements in these areas have been achieved in recent years. Average slaughter weights for cattle and hogs continue to increase (table 19), as do average milk yields per cow (figure 18). These improvements are the result of increased feed available per animal, some increases in feed quality, and breed improvement work, particularly for cows. The rise in animal productivity has, at least

[92]*Vestnik agroproma*, No. 30 (1988).

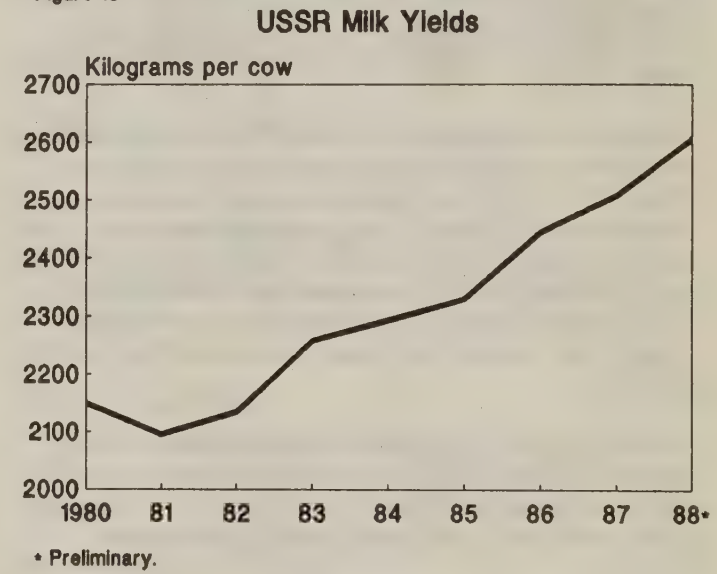
[93]Cook, Edward C., *The Soviet Livestock Sector: Performance and Prospects*, FAER No. 235, U.S. Dept. Agr., Econ. Res. Serv., June 1988, p. 3.

Table 19--USSR average livestock slaughter weights

Year	Cattle	Hogs
	Kilograms/head	
1980	298.7	101.2
1983	307.6	104.0
1984	310.1	104.4
1985	309.8	105.4
1986	325.9	106.6
1987 1/	329.7	107.1
1988 1/	334.0	108.7

1/ Estimate.
Source: Calculated from data in Vestnik statistiki, various issues.

Figure 18



* Preliminary.

temporarily, halted the longer term trend of increasing costs of production for major livestock products (figure 19).

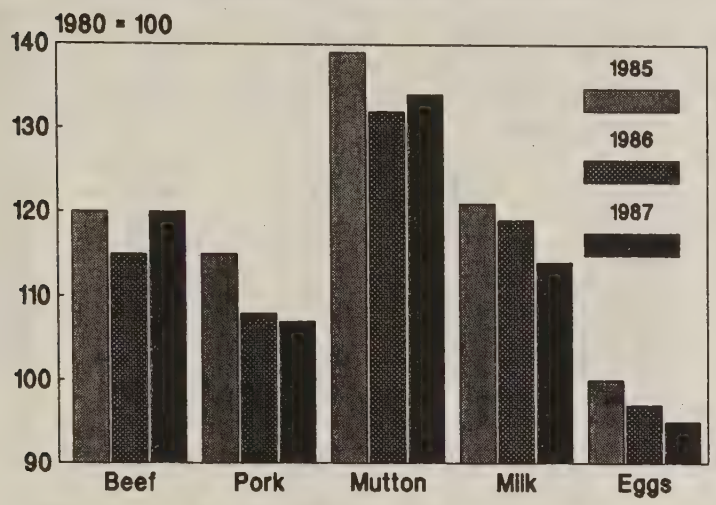
Hoped-for improvements in feeding efficiency (the amount of livestock output produced per unit of feed fed) have been slower to materialize. After significant gains in 1986, there was virtually no improvement in feeding efficiency in 1987 except for broilers (table 20). Preliminary estimates indicate little or no improvement in 1988 either, indicative of the limited success in raising feed quality.

Livestock Growth

The value of gross livestock production as reported in the USSR increased by 3.4 percent in 1988. The ERS Centrally Planned Economies Branch index of livestock growth--based on output of meat by type, milk, eggs, and changes in animal inventories--increased by 2.6 percent. The preliminary production data for meat, milk, and eggs in 1988 in table 21 may be raised slightly in following months. Compared with the last 2 years, when preliminary meat production was revised upward by

Figure 19

USSR Livestock Production Cost Index*



*Prime costs on state and collective farms.

about 300,000 tons, only a modest rise, if any, in the meat production figure is anticipated this year.

Despite the improvements in animal productivity, a good portion of the increase in meat production since 1986, particularly of beef, can be attributed to inventory drawdowns. Though policymakers in the USSR are not pursuing a goal of expanded animal inventories, they would like to maintain cattle inventories no lower than 120 million head.[94] The decline of cattle numbers to 118.8 million head as of January 1, 1989, is a cause for some concern (table 22). The situation with cattle is particularly complex, because as milk yields increase, the number of dual purpose cows will continue to decline.[95] Because beef cattle account for only about 3-4 percent of Soviet cattle inventories, some major changes have to be made if beef production is to continue climbing at expected rates.

For 1989, cattle inventories are expected to stabilize or increase slightly, with the result that slaughter numbers will decline from 1988. Without a repeat of the large productivity improvements recorded in 1986, beef production could easily decline this year. The prospects for pork and poultry meat are better. Because of its priority access to feed supplies, poultry meat production is expected to increase 4-5 percent, comparable to growth

[94] *Sel'skaya zhizn'*, 11/27/88, and *Vestnik agroproma*, No. 28 (1988).

[95] *Ibid.*

Table 20--USSR feed-conversion coefficients

Product	1970	1980	1983	1985	1986	1987
	Kg. of oat-unit equivalent/kg. of output					
Beef	11.5	13.4	13.2	13.5	12.9	13.0
Pork	9.2	9.2	8.8	8.8	8.2	8.1
Milk	1.4	1.5	1.55	1.6	1.5	1.5
Broilers 1/	4.6	4.3	4.1	4.0	3.9	3.7
Eggs 1/	2.8	2.0	1.9	1.9	1.8	1.75

NA = not available. 1/ Ptitseprom system (State poultry industry) only. Eggs--oat units per 10.

Table 21--Production of principal livestock products, USSR

Year	Meat 1/						Milk	Wool 2/	Eggs
	Total	Beef and veal	Pork	Mutton, lamb, and goat	Poultry	Other			
	1,000 metric tons								Millions
1966-70 average	11,583	5,187	4,327	992	853	224	80,553	NA	35,840
1971-75 average	14,004	5,985	5,394	972	1,335	318	87,446	425	51,427
1976-80 average 3/	14,843	6,827	5,009	882	1,835	290	92,662	442	63,133
1981-85	16,226	6,973	5,606	838	2,555	252	94,579	457	74,422
1981	15,199	6,627	5,220	846	2,255	251	88,874	460	70,855
1982	15,368	6,618	5,273	816	2,425	236	91,044	452	72,409
1983	16,449	7,011	5,760	837	2,596	245	96,463	462	75,110
1984	16,985	7,244	5,927	866	2,686	262	97,906	465	76,482
1985	17,131	7,370	5,853	827	2,816	265	98,608	447	77,255
1986	18,057	7,840	6,065	894	2,988	270	102,173	469	80,746
1987	18,940	8,288	6,324	905	3,126	297	103,774	461	82,737
1988 4/	19,300	5/ 8,450	5/ 6,400	5/ 900	5/ 3,250	5/ 300	106,400	476	84,600

1/ Carcass weight, including fat. 2/ Physical weight. 3/ Revision based on the average published in Narodnoe khozyaistvo SSSR v 1982. Is not consistent with average derived from last published figures for each year. 4/ Preliminary Soviet figures except where noted. 5/ ERS estimate.

Table 22--January 1 livestock numbers and animal units, USSR

Year	Cattle		Hogs	Sheep	Goats	Horses	Poultry	Total animal units 1/
	Total	Cows						
				Million head				
1971	99.2	39.8	67.5	138.0	5.4	7.4	652.7	130.5
1976	111.0	41.9	57.9	141.4	5.7	6.4	734.4	136.5
1981	115.1	43.4	73.4	141.6	5.9	5.6	1,032.4	149.4
1982	115.9	43.7	73.3	142.4	6.1	5.6	1,067.5	150.8
1983	117.2	43.8	76.7	142.2	6.3	5.6	1,104.5	153.4
1984	119.6	43.9	78.7	145.3	6.5	5.7	1,126.1	156.3
1985	121.0	43.6	77.9	142.9	6.3	5.8	1,143.0	157.0
1986	120.9	42.9	77.8	140.8	6.5	5.8	1,165.5	156.9
1987	122.1	42.4	79.5	142.2	6.5	5.9	1,174.0	158.3
1988	120.6	42.0	77.4	140.8	6.5	5.9	1,175.0	156.5
1989	118.8	41.5	77.7	2/ 139.4	2/ 6.5	2/ 6.0	2/ 1,190.0	2/ 155.6

1/ In terms of cows. Conversion ratios as follows: Cattle (other than cows) 0.6; hogs 0.3; sheep and goats 0.1; horses 1.0; and poultry 0.02. 2/ Estimate.

in recent years. If major productivity gains are not made for cattle and hogs, though, total meat production is expected to increase by only 1-1.5 percent in 1989.

The less-than-satisfactory situation with roughage feeds entering 1989 should translate into a smaller increase in milk production this year than the 2.5-percent growth in 1988. Improvements in breeding and management in the dairy sector should ensure that milk production does not stagnate or decline. Though the plan for egg production and consumption in 1990 was surpassed 2 years ago, egg output will continue to expand in 1989. Soviet egg consumption per capita now exceeds that of the United States. Concerns about cholesterol continue to be outweighed by the reliability of further production increases and the cost effectiveness of eggs relative to meat in the USSR.

Demand

Availability of livestock products through the State distribution system continued to increase more rapidly than livestock production in 1988, as a larger share of meat, milk, and egg production was sold to the Government than in 1987. Increases in supply of these commodities, however, are being overwhelmed by increases in incomes of the population (see economic section above). Given consumer preferences, the limited availability of other consumer goods, the strong hesitancy to increase retail prices of livestock products, and apparent difficulties in restraining growth in money incomes, availability of meat and certain milk products will have to increase by much larger amounts than have been achieved in recent years before the perceived market shortages can be reduced. In the case of meat, effective demand now greatly outstrips the 1990 consumption target of 70 kilograms, which is the figure policymakers appear to have their sights on.

According to preliminary reports, per capita consumption of meat was 65 kilograms in 1988, compared to 64.1 in 1987 (table 23). The 1988 figure may be increased slightly when final data become available. Consumption of milk and milk products (all products including butter expressed in a whole milk equivalent) increased from 341 kilograms in 1987 to 351 in 1988. Much of the milk protein implied by these numbers (about 40-45 percent) does not reach consumers, though, but is fed to livestock as byproducts of butter and cream production or is wasted. *(Edward C. Cook)*

Oilseeds

Soviet oilseed production should increase in 1989, with a record output of about 13 million tons possible. This compares to an estimated 12.7 million tons in 1988 (excluding flax for fiber). Output of sunflowerseed, soybeans, and rapeseed should all expand. Production of all major oilseeds rose in 1988, as measures introduced in 1987 to improve production incentives and techniques took effect (table 24).

Production

The Soviets continue to promote oilseed production in order to raise the protein content of mixed feeds. The USSR still lags far behind the West in the quality of livestock feed, and thus in livestock productivity. Oilseed meal comprises only 9 percent of Soviet mixed feed, one-third the amount in the United States and one-fourth that in West Germany and the Netherlands.[96] The 1990 target for oilseed output (excluding cottonseed and flax for fiber) is 10.4 million tons. Production in 1988 (again

[96] *Vestnik agroproma*, No. 30 (1988).

Table 23--USSR consumption norms of selected food products and per capita consumption

Year	Meat and fat	Fish and fish products	Milk and milk products 1/	Eggs 2/	Sugar	Vegetable oil	Potatoes	Grain 3/	Vegetables and melons	Fruit and berries
					Kilograms					
1950	26	7.0	172	60	11.6	2.7	241	172	51	11
1960	40	9.9	240	118	28.0	5.3	143	164	70	22
1970	48	15.4	307	159	38.8	6.8	130	149	82	35
1980	58	17.6	314	239	44.4	8.8	109	138	97	38
1981	57	18.0	304	247	44.5	9.1	104	137	99	40
1982	57	18.4	295	249	44.5	9.3	110	137	101	42
1983	59	17.4	313	256	44.3	9.6	109	134	102	44
1984 4/	61	17.5	319	258	44.0	9.5	108	133	102	45
1985	62	18.0	325	260	42.2	9.7	104	133	102	48
1986	62	18.6	333	268	44.0	9.8	107	132	102	56
1987	64	18.0	341	272	47.2	10.0	105	132	100	55
1988	65	18.0	355	275	46.0	10.0	103	131	100	52
1990 plan	70	19.0	330-340	260-266	45.5	13.2	110	135	126-135	66-70
Consumption norm 5/	82	18.2	405	292	40.0	9.1	110	115	130	91

1/ Including milk equivalent of butter. 2/ Number. 3/ Flour equivalent. 4/ Vestnik statistiki, No. 3, 1986, p. 57. 5/ Narodnoe blagosostoyanie SSSR (National Welfare in the USSR), 1983, p. 165.

Table 24--Oilseed production, USSR 1/

Year	Sun-flower seed	Cotton-seed	Soy-bean	Rape-seed	Other	Total
			1,000 metric tons			
Averages						
1971-75	5,974	4,349	471	8	234	11,036
1976-80	5,309	4,656	529	13	193	10,700
1981-85	4,974	4,936	505	55	171	10,641
1986	5,258	4,870	703	110	157	11,098
1987	6,075	4,490	712	296	163	11,729
1988	6,157	5,020	880	420	176	12,653

1/ Cottonseed is USDA estimate; other does not include oilseeds from fiber flax and hemp; and total is an estimate.

excluding cottonseed and flax for fiber) rose 5 percent to 7.6 million tons, 97 percent of the year's target.

Sunflowerseed, soybeans, and particularly rapeseed have been given special attention for increased production. In 1987, the Soviets raised procurement prices and bonuses for added sales of these crops, which induced farms to expand area. These crops have also been favored in the allocation of fertilizers, herbicides, pesticides, improved machinery, and research. A shortage of herbicide, though, remains a major problem in expanding oilseed production.

Sunflowerseed output in 1989 should again rise, because of a modest increase in area and perhaps also in yield. In 1988, output rose by 1.5 percent and area by 3 percent. Although yield declined from 1.46 tons per hectare in 1987 to 1.43 tons in 1988, this value is high by historical standards. Higher procurement prices and favorable weather (above-average temperatures and moderate rainfall) in the North Caucasus and Ukraine contributed to the growth of sunflowerseed output in 1988. High temperatures also improved oil content over 1987.

The Soviets continue to tout IT as a main cause of rising sunflowerseed output. IT was reportedly practiced on 2.6 million hectares in 1988 (59 percent of total area),[97] compared to about 2 million in 1987. One Soviet source states that IT increases sunflowerseed yield by 0.26 to 0.51 tons per hectare.[98] Though some skepticism might be in order concerning Soviet claims about IT's merits, one practice that should have effect for sunflowerseeds is the use of new hybrids and varieties, intended for about 2.6 million hectares. IT's gains, though, are not likely to be sufficient to achieve the 1990 output target of 7 million tons.

Cottonseed output in 1989 should be slightly higher than in 1988. Though yields should rise, area will continue its fall of the past year--part of the Soviets' move to improve crop rotation with soil-depleting crops such as cotton. Despite the area decline in 1988, output is estimated to have risen 12 percent. Yield increased by perhaps 14 percent, primarily because of better weather than during

[97]*Vestnik agroproma*, No. 1 (1988).

[98]*Vestnik agroproma*, No. 7 (1989).

the 2 previous years. Although cottonseed is the Soviets' main source of oilmeal and second major source of vegetable oil, it is not a favored child of the oilseeds establishment (production is even excluded in official oilseeds data). The neglect occurs mainly because cottonseed comes from seed cotton, which means production depends little on oilseed policies. Cottonseed appears to fall through the bureaucratic cracks of Soviet agriculture. Unlike the other major oilseeds, cottonseed procurement prices were not raised in 1987.

Soybean production should continue to rise, as area expands. Output in 1988 rose 24 percent to a record, and over one and a half times the 1981-85 annual average. A 27-percent rise in yield accounted for the growth, as area fell 3 percent. The Soviets hope to further increase national yields through improved crop rotation, better climatized hybrids, and more effective weed control. Although about three-quarters of soybeans are grown in the Soviet Far East, the Soviets would like to expand production in the Ukraine to 225,000 tons by 1990. Officials have been talking about increasing Ukrainian soybean production for over a decade, though, and thus far little real effort has been made.

Rapeseed should continue in 1989 as the oilseed with the highest growth rates of area and output. Output in 1988 increased 42 percent and area 46 percent, as part of a planned fourfold expansion in area over 1987-1990. Expansion continues in the Baltics, Belorussia, Siberia, and Kazakhstan. Rape is also reportedly favored among oilseeds in the allocation of fertilizer, herbicides, and chemicals for pest control. Progress continues in reducing the erucic acid content of the crop and increasing oil content, with some new strains achieving an oil level of 45 percent.[99] The Soviets are also working on the development of a strain of hardy, high-oil winter rape.

Meal and Oil Output

In calendar 1989, estimated oilseed meal output (soybean meal equivalent) of 5.3 million tons would be a record. The rise in 1988 domestic output of oilseeds and the growth of soybean imports in 1989 should increase the total domestic crush. Meal production in 1988 was an estimated 5 million tons (soybean meal equivalent), about 4 percent below 1987. If vegetable oil production in 1989 reaches 3.3 million tons, that would also be a record. Production in 1988 was around 3.1 million tons, up about 5 percent from 1987, but still only 85 percent of the target. Although domestic production may rise in 1989, imports should remain steady, or even increase slightly, because of the Soviets' desire to increase consumption of vegetable oil. *(William M. Liefert)*

[99]*Ibid.*

Sugarbeets

Sugarbeet production in 1989 could exceed 1988's 87.855 million tons and the target of 87.3 million tons (table 25). Area was down about 1 percent, yields 2 percent in 1988. The Soviets have, however, lowered the Government sugarbeet purchase target from 1988's 83 million tons to 78.6 million.

The 1988 sugarbeet crop was about 3 percent lower than 1987, but 11 percent higher than 1986 and 15 percent above the average annual production during 1981-85. Discerning the positive effects of IT on production is difficult. In 1985, the overall yield of sugarbeets produced on the 2.4 million hectares under IT was reportedly 1 ton per hectare higher than that of sugarbeets produced without IT. This small increase was insufficient to affect the overall situation. The total average yield dropped, and the costs per 1 quintal of sugarbeets rose 4 percent over 1984. In 1986, the area under IT was 2.6 million hectares, yet total yield dropped by another 3 percent and costs went up 2 percent. Compared to the annual average in 1981-85, costs were up 7 percent.

The increased use of inputs associated with IT has contributed to higher production costs. For example, in the Ukraine's Zhashkovskii rayon during 1976-85, the prime cost of 1 ton of sugarbeets never exceeded 18 rubles; in 1986, it went up to 20 rubles. For the decade, material costs per 1 hectare of sowing area increased by 44 percent; costs in 1986 equaled 876 rubles. This increase was due to a much greater use of fertilizers, plant protectants, and higher prices for seeding materials, chemicals, and machinery.

Soviet publications describe losses caused by mismanagement:

- frequently, sugarbeets are harvested before they develop their full sugar content (either because of orders from local administrators or a farm manager's own ignorance);
- sometimes the sugarbeets remain in the fields for long periods owing to backlogs at reception centers; and
- sometimes the harvest simply gets buried under the snow.

In each case the losses are quite high.[100] As the prime costs have gone up, the marginal returns have gotten even smaller.

Soviet sources report that errors are committed in the major sugarbeet-producing area in the USSR, the Ukraine. In 1981-85, the Ukraine's Vinnitsa oblast

[100]*Sotsialisticheskaya industriya*, 9/20/88.

Table 25--Area, yield, and production of selected crops, USSR

Year	Seed cotton	Sugar-beets	Sunflower-seed	Fiber flax 1/	Potatoes	Vege-tables	Fruit, berries, grapes
				1,000 hectares			
Area							
1966-70 average	2,527	3,582	4,837	1,341	8,238	1,440	2,626
1971-75 average	2,810	3,527	4,474	1,234	7,953	1,601	3,304
1976-80 average	3,043	3,745	4,471	1,156	7,020	1,629	3,339
1981-85 average	3,242	3,504	4,142	1,020	6,771	1,710	3,321
1986	3,475	3,399	3,848	975	6,373	1,698	3,167
1987	3,527	3,404	4,156	971	6,239	1,713	3,134
1988	3,432	3,370	4,280	931	6,079	1,726	NA
				Metric tons per hectare			
Yield 2/							
1966-70 average	2.41	22.8	1.32	0.34	11.5	13.2	3.7
1971-75 average	2.73	21.7	1.34	0.37	11.3	13.7	3.7
1976-80 average	2.81	23.6	1.19	0.34	11.8	15.2	4.5
1981-85 average	2.56	21.8	1.20	0.37	11.5	16.1	5.4
1986	2.37	23.3	1.36	0.38	13.7	16.4	5.8
1987	2.29	26.6	1.46	0.44	12.1	15.9	4.6
1988	2.53	26.1	1.43	0.35	10.3	15.7	NA
				1,000 metric tons			
Production							
1966-70 average	6,099	81,118	6,389	458	94,813	19,472	9,710
1971-75 average	7,667	75,984	5,974	456	89,782	22,974	12,393
1976-80 average	8,547	88,732	5,309	393	82,571	26,313	15,177
1981-85 average	8,314	76,379	4,974	377	78,351	29,226	17,807
1986	8,234	79,299	5,258	366	87,186	29,740	18,338
1987	8,089	90,405	6,075	425	75,908	29,216	14,321
1988	8,689	87,855	6,157	323	62,705	29,330	14,500

NA = Not available. 1/ Flax grown for fiber production. 2/ Soviet reported yields vary from calculated yields in some instances.

produced 2.89 tons of sugar per hectare. Despite IT and other reform programs, in 1986-88, the oblast's results were much lower. Also, Poltava, Sumy, Kirovograd, and Khar'kov oblasts fell far short of the planned targets. The last time Khar'kov oblast managed to meet its sugarbeet and sugar production obligations was in 1976. Although sugarbeet production should theoretically be very profitable, 10 percent of all collective farms in the Ukraine produce sugarbeets at a loss. In 1987, 860 of the farms produced less than 20 tons of sugarbeets per hectare and 108 farms less than 10 tons per hectare, while the USSR average was about 27 tons.[101]

Reflecting the overall deterioration of water and agronomic conditions in irrigated areas, productivity on irrigated land in secondary producing areas has fallen. In the majority of Kazakhstan's rayons, the sugarbeet yield on irrigated lands equals 16-20 tons per hectare; 15-20 years ago the lands produced 35-40 tons per hectare, with some farms reaching 45-50 tons. Low sugarbeet crops in Kirgizia have raised doubts about the wisdom of continuing sugarbeet production and refining there, although according to the Soviets not too long ago Kirgizia was the cheapest producer of sugar in the world.[102]

Refined sugar production in calendar 1988 from all sources was 12.1 million tons (table 26). About 85 percent of the sugarbeets harvested in a season are processed by the end of the calendar year. For the refined sugar output from sugarbeets to meet or exceed 1987's 8.8 million tons, the sugar content of the beets would have to be higher (which may have been possible given the drier growing and harvesting conditions in 1988) or the substantial pre-refining losses would have to be less.

Although the sugar extraction rate from sugarbeets has improved substantially in the last several years, the 1986-87 average was still 9 percent less than the 1966-75 average. The 1976-85 extraction rates averaged 21 percent below those in 1966-75. Soviet data for 1988 are not available.

Extraction rates declined, in part, due to poorly designed economic incentives instituted in the 1970's. Farms were

[101] *Pravda*, 9/14/88.

[102] *Voprosy ekonomiki*, No. 1 (1989), p. 17.

Table 26--USSR sugar production and trade 1/

Year	Industrial production		Imports			Exports refined
	Total	Of which from beets	Raw		Refined	
			Total	From Cuba		
			1,000 metric tons			
1966-70 average	10,203	8,638	2,082	2,081	2	1,097
1971-75 average	9,694	7,771	2,154	1,812	82	249
1976-80 average	10,854	7,370	3,845	3,374	439	139
1981-85 average	11,644	7,240	4,885	3,495	827	184
1986	12,729	8,000	5,158	3,861	23	301
1987	13,700	8,800	5,035	3,750	20	159
1988	12,100	2/ 8,600	2/ 4,100	NA	NA	NA

1/ All data on refined basis except raw imports. The factor for converting raw to refined is 0.92.
2/ Estimate.

primarily responsible for meeting sugarbeet tonnage production targets and less so for meeting targets regarding the sugar content of the beets. To fulfill the plan and receive bonuses, farms have opted for increasing inputs, even using more nitrogen fertilizers. While nitrogen boosts the crop weight, it tends to lower the sugar content and makes the beet more perishable.

The incentives for processing plants likewise are distorted. Soviet refineries receive wages and bonuses according to the amount of sugarbeets processed. Thus, they are willing to accept from farms poor-quality sugarbeets with low sugar content. Furthermore, basing the criterion for remuneration on the amount of sugarbeets processed versus the amount of sugar produced lessens the incentives for the refinery to store the sugarbeets carefully. Only half of the storage facilities are equipped with cooling systems. Over 57 percent of the sugarbeet crop is simply stored in piles. Because appropriate temperature and moisture levels cannot be maintained, part of the crop is frostbitten and rotten. There is little sorting and grading, so quality beets end up being mixed with substandard produce, soil, and trash, which together sometimes amount to 30 percent of the total. A Soviet newspaper graphically describes the situation:

> This unripened, semiwithered and spoilt crop, unsuitable for storage, is packed into storerooms at high temperatures. During the first days and weeks of storage the sugarbeets heat intensively, beginning to boil and spoil, and at times become totally unsuitable for processing into sugar.[103]

Processing of such sugarbeets has not only cut sugar production, but led to massive output of substandard sugar with an unpleasant color.

Attempts to measure sugar content have been discouraged by "leaders of the industry" because it would expose the magnitude of losses and inefficiency in the system. The newspaper says the result is that sugarbeet industry statistics for the past 20-30 years are almost useless, failing to provide any measure of a harvest's sugar content or of losses in storage, transportation, and refining.

The problems that plague the Soviets in using imported equipment and technology also occur in the sugar industry, as the following example illustrates: "Two sets of equipment for sugar refineries were bought from Poland back in 1980. One set, costing 12.6 million rubles, was destined for Voronezh oblast and the other, costing 4.2 million rubles, was for Ternopol oblast. A large part of this equipment is still in warehouses."[104]

The demand for sugar to produce alcohol, created when the State cut back on liquor, wine, and beer production, combined with the static retail prices, has resulted in shortages. The magnitude of the problem was fully demonstrated when sugar rationing was introduced even in Moscow in May 1989. *(Yuri Markish)*

Cotton

Soviet cotton production in 1989 got off to a poor start as rain and cold in the spring damaged many seedlings and necessitated resowing. Thus, the crop may not match 1988's rebound crop, which was produced under good growing and excellent harvesting conditions. With cotton area increasing from 3.3 to 3.5 million hectares from 1985 to 1987, Soviet leaders are attempting to cut area to improve crop rotations and move from the monoculture of cotton. They call for improved yields from the better lands to offset the area declines and thus further increase production.

[103] *Sotsialisticheskaya industriya*, 9/20/88.

[104] *Izvestiya*, 1/13/89.

The republics may finally be having some success in convincing the national authorities that the area cuts will necessitate production declines. Uzbekistan has been able to get the national Government to agree to a 5-million-ton target for 1990 and Tadzhikistan to get the 1992 plan reduced to 800,000 tons.[105] The full area and production cuts likely will be difficult to realize as local officials, farmers, and workers in Soviet Central Asia are extremely dependent on the funds associated with producing and processing this high-value crop.

Uzbekistan, which produces over 60 percent of Soviet cotton, provides an example of the cotton dilemma. Despite plans to restrict cotton area and improve crop rotation cycles, Uzbek cotton area increased 118,000 hectares from 1985 to 1987 and the cotton-alfalfa rotation areas fell from 55 percent of the arable land to 42.[106] The 1988 cotton area was 2.017 million hectares. This reportedly exceeded the cotton area plan by 2 percent, but was 91,000 hectares less than 1987.[107]

The planned Uzbek cotton area of 1.93 million hectares in 1989 is to be even below 1988's plan. Still, the republic was asked to harvest 5.35 million tons of seed cotton.[108] This is about 2 percent higher than 1988's target and almost as much as Uzbekistan produced in 1988 from an area almost 5 percent higher. To meet the 1989 production and area plans would require yields 4 percent higher than 1988 and 20 percent above 1987. Since the cotton crop is already totally irrigated and excellent harvesting weather prevailed in 1988, obtaining such a yield increase will be difficult. The 1989 fiber target for Uzbekistan was also raised, to 1.71 million tons, up 1.75 percent from 1988 according to the plan proposed in October 1988.[109]

Cotton-alfalfa crop rotation increases yields, improves efficiency, reduces fertilizer and irrigation costs, and combats wilting. Increasing forage production would help to raise per capita meat consumption in Soviet Central Asia, which according to some reports is far below the national average of 65 kilograms.

In 1988, the Soviet Union produced 8.689 million tons of seed cotton, a 7.4-percent increase (table 27). Uzbekistan's production was up 10 percent,

Table 27--USSR: Cotton production

Republic	1976-80	1981-85	1986	1987	1988
			Million hectares		
Area					
USSR	3.043	3.242	3.475	3.527	3.432
Uzbekistan	1.823	1.931	2.054	2.108	2.017
Turkmenistan	.504	.532	.650	.633	.636
Tadzhikistan	.295	.308	.313	.324	.320
Azerbaijan	.231	.297	.300	.303	.299
Kazakhstan	.117	.130	.129	.128	.128
Kirgizia	.073	.044	.029	.031	.032
			Million tons		
Total seed cotton production					
USSR	8.547	8.314	8.234	8.089	8.689
Uzbekistan	5.359	5.159	4.989	4.858	5.365
Turkmenistan	1.130	1.142	1.138	1.272	1.341
Tadzhikistan	.906	.917	.922	.872	.964
Azerbaijan	.627	.707	.784	.702	.616
Kazakhstan	.317	.302	.333	.312	.324
Kirgizia	.208	.087	.068	.073	.079
Fine-fiber seed cotton					
USSR	.794	1.088	1.188	1.179	1.334
Uzbekistan	.301	.494	.584	.531	.561
Turkmenistan	.225	.304	.295	.372	.444
Tadzhikistan	.268	.289	.309	.276	.329
Lint production					
USSR	2.612	2.453	2.660	2.467	2.700
Uzbekistan	1.620	1.509	1.622	1.478	NA
Turkmenistan	.338	.335	.354	.380	NA
Tadzhikistan	.289	.278	.293	.261	NA
Azerbaijan	.203	.212	.262	.228	NA
Kazakhstan	.097	.093	.108	.097	NA
Kirgizia	.065	.026	.021	.023	NA

Source: Sel'skoe khozyaistvo SSSR, 1988 and Vestnik statistiki, No. 4, 1989.

Turkmenistan's 5 percent, and Tadzhikistan's 11 percent. Cotton area in 1988 declined 2.7 percent compared with 1987, but yields increased over 10 percent. Uzbekistan's yield was up 15 percent, Tadzhikistan's 12 percent, and Turkmenistan's 5 percent. The Uzbek yield and the overall 1988 yield are around the 1981-85 averages and still substantially below the averages during the 1970's, reflecting the deteriorating soil and water conditions.

The Soviets reported that lint output in 1988 was 2.7 million tons (an increase of 9 percent), with four republics exceeding targets.[110] The implied ginning rate for the 1988 crop was 31.1 percent, slightly above 1987's 30.5 percent. The implied ginning rate target for Uzbekistan in 1989 is 32 percent.

Input Problems

If the IT program is having an effect, it is only managing to outpace negative factors in maintaining Soviet cotton production. And if the entire 1986-88 period is taken as a reference, IT has not halted the yield decline that began in the 1980's. Because of the lack of quality infrastructure and inputs, the IT program faces a major

[105]According to the Chairmen of the State Planning Committees of Uzbekistan and Tadzhikistan, Moscow Television Service, 1500 GMT, 3/29/89, translated in FBIS-SOV-89-062, 4/3/89, pp. 50-70.

[106]*Sel'skaya zhizn'*, 2/25/88, p. 2, translated in FBIS-SOV-88-166, 8/26/88, pp. 40-43.

[107]*Pravda vostoka*, 9/30/88 and 1/13/89.

[108]*Pravda vostoka*, 1/14/89 and *Ekonomika i zhizn'*, No. 10 (1988), p. 61.

[109]*Izvestiya*, 10/30/88, p. 2, translated in FBIS-SOV-88-216, 11/8/88, pp. 45-46.

[110]*Pravda*, 1/22/89, pp. 3-5, translated in FBIS-SOV-89-015, 1/25/89, pp. 75-89.

challenge in improving Soviet cotton production agronomics and mechanization.

Uzbekistan has 25 water reservoirs, 200,000 kilometers of irrigation channels, and 1,200 large modern farms; irrigation water is potentially available to 3.7 million hectares. However, 1.6 million hectares are too salinated to use for production, leaving only about 2.1 million. The most dangerous secondary salinization induced by irrigation occurs on newly redrained lands.

In the last 10 years, 28 billion rubles were invested to develop 1 million hectares of land in three Uzbekistan oblasts, Djizak, Kashkadar'ya, and Syrdar'ya. Sixty-six State farms (44 percent of the State farms in the three oblasts), which together have received 2.5 billion rubles over that period, produce only 1.0-1.1 tons of seed cotton per hectare and operate at an annual loss of 45 million rubles.[111] Only 26 of 132 rayons fulfilled procurement plans. On one-third of the farms, yields were less than 2.0 tons per hectare.[112] Secondary salinization exists on 52 percent of the total irrigated area of the Djizak oblast, 50 percent of Kashkadar'ya oblast, and 35 percent of Syrdar'ya oblast. Furthermore, salinization is rising and land with secondary salinization is extremely difficult to reclaim.[113]

The Government annually spends 60-65 rubles to maintain each hectare of Uzbek's irrigated plowlands. In Uzbekistan, the total cost of operating the hydrotechnical facilities is as high as 250-260 million rubles. For cotton growing, the optimal water use rates range from 4,000 to 8,000 cubic meters, depending on zonal conditions. Actual use fluctuates between 12,000 and 17,000 cubic meters, salinizing fields and creating swamps.[114] Most intrafarm irrigation systems in the republic in 1988 still did not have water meters.[115]

The predominance of one-crop systems exhausts the soils and increases the incidence of wilt and pest infestations. In Tadzhikistan, a third of the cotton area is involved in crop rotation, in Azerbaijan 25 percent, and in Kirgizia only 6 percent. These problems contribute to substantial dependence on chemical fertilizers and pesticides. Application of mineral fertilizers was 410 kilograms per hectare in 1987, versus the approximately 240 kilograms used on irrigated cotton land in the United States. Many of the pesticide formulations are obsolete. In the last decade, Uzbek cotton farms have used nearly 6,000 tons of chlorine-based pesticides, which are banned in the West.[116]

Labor use per hectare of cotton field in the last 2-3 years has ranged from 900 to 1,000 man-hours, with about half for harvesting. The norm, however, is set at 600-700 man-hours. Although making a comparable estimate is difficult, U.S. labor use is much less, with direct inputs perhaps about 55 man-hours per hectare. The Soviet labor intensiveness is encouraged by the lack of operating, high-quality harvesters (despite large total machine inventories), the large pool of unskilled labor, and the ability to use city residents and students for hand harvesting.[117] In addition, since payments are now tied to fiber quality and quantity, rather than gross weight of seed cotton, farms may be more sensitive to the quantity losses (5-7 percent) and quality degradation inherent in machine harvesting. However, in Tadzhikistan, 58 percent of the crop payments in 1987 were based on fiber content, versus seed cotton, yet industry officials complained that ginning rates had improved only 3 percent.[118] Furthermore, the Tadzhik officials say that processing costs are 20 percent higher because of the additional measuring, payment, and sorting.

The losses associated with mechanized harvesting in the USSR are higher than in the West in part because of poor combine design. *Pravda vostoka* contends that for the foreseeable future the farms will not be able to dispense with help from the cities.[119] For many years, up to 1.5 million urban residents in Uzbekistan were forced to assist with the harvest. Now their number has gone down to 600,000.[120]

The share of machine-picked cotton in Uzbekistan in 1987 was 42 percent (63 percent of planned) and as of October 27, half of the 1988 crop was machine harvested.[121] The 1987 level had been achieved before in the early 1970's. In 1986, out of 37,000 machines, only 23,000 were operational in the republic, which entailed losses of 40 million rubles. The average seasonal output per combine is 50 tons of cotton, although 100-120 tons are required to make investment in combines profitable. Turkmenistan now has 11,000 cotton combines, though its actual needs are much lower. Other republics, including Uzbekistan, also have excessive combine pools. About half of them are not used for harvesting, although each machine can replace 40-50 people.[122]

[111] *Ekonomika i zhizn'*, No. 10 (1988), pp. 60-62.

[112] *Ekonomicheskaya gazeta*, No. 35 (1988), p. 11.

[113] *Ibid.*

[114] *Khlopok*, No. 6 (1988), p. 7.

[115] *Sel'skaya zhizn'*, 8/25/88, p. 2, translated in FBIS-SOV-88-166, 8/26/88, pp. 40-43.

[116] *Pravda*, 8/4/88 and 9/15/88.

[117] *Pravda*, 9/15/88 and *Sel'skaya pravda*, 9/9/88.

[118] *APK Tadzhikistana*, No. 9 (1988), pp. 33-35.

[119] *Pravda vostoka*, 9/10/88.

[120] *Pravda vostoka*, 1/14/89.

[121] TOFAS, 11/4/88, reporting on an article in *Pravda vostoka*, 10/27/88.

[122] *Pravda*, 9/15/88 and *Sel'skaya pravda*, 9/9/88.

Fine-fiber Output

The Soviets have had some success in 1988 in expanding fine-fiber cotton production. Production of fine-fiber lint was 405,000 tons, versus 371,000 tons in 1987.

The Soviets provide more data on fine-fiber output on a seed cotton basis. Based on their historical data series for the three largest producing republics, 1988 production was up 13 percent from 1987. The 1.3 million tons equaled 15.3 percent of the crop and likely was the highest ever. In Tadzhikistan, fine-fiber seed cotton output was up 53,000 tons and the share of total seed cotton was 34 percent, up from 32 in 1987. In Turkmenistan, the fine-fiber output was up 72,000 tons in 1988, equaling 33 percent of total seed cotton, compared with 29 percent of the small 1987 crop. In Uzbekistan, fine-fiber seed cotton production was up 30,000 tons in 1988. However, it accounted for 10.5 percent of production, down from 10.9 percent of the small 1987 crop.

The increased production of fine-fiber lint may mean smaller-than-usual cotton import requirements in 1989. The USSR's cotton imports generally involve better quality fiber. Syria has been the most consistent supplier, with very fine quality cotton from Egypt in a number of years. The United States captured a sizable part of the Soviet import market in the 3 years in which it sold cotton to the USSR. The PRC emerged as a major supplier in 1986 and 1987, though probably of lower quality cotton.

Generally the Soviets are insignificant exporters in the world agricultural commodity markets. The exception is in cotton trade (table 28). Soviet cotton exports increased during the 1970's (from 516,000 tons in 1970 to the peak of 972,000 in 1977), and imports declined as domestic production increased. As the problems from cotton monoculture and overirrigation accumulated, production and quality stagnated in the 1980's. With increasing domestic needs, imports rose and exports fell, although the trend reversed somewhat in 1986 and 1987.

Table 28--USSR lint cotton production and trade 1/

Year	Production	Imports	Exports	Domestic supplies 2/
		1,000 metric tons		
1980/81	2,700	22	916	1,806
1981/82	2,402	26	949	1,479
1982/83	2,312	177	774	1,715
1983/84	2,172	166	642	1,696
1984/85	2,597	187	659	2,125
1985/86	2,782	88	713	2,157
1986/87	2,660	75	783	1,952
1987/88	2,467	90	800	1,757
1988/89	2,700	NA	NA	NA

1/ USSR published data, except for ERS trade estimate for 1988 and ERS production estimates for individual years based on USSR 1987 data of 2,453-million-ton average for 1981-85. Calendar year trade beginning with 1981 data for 1980/81. 2/ Production minus net exports.

Most of the USSR's exports go to socialist countries; in 1983-87, 65 percent went to Eastern Europe and another 15 percent to other socialist countries. The exports are made under essentially barter arrangements, at trade prices based upon the 5-year average of world prices. The European Community (EC), primarily France, and Japan have occasionally been mentionable customers.

Soviet cotton cloth production in 1987 increased 2 percent over 1986 and 8 percent over the 1981-85 annual average. The cotton cloth share of total cloth production reached only 62 percent in 1987, a 2-percent decline from the 1981-85 annual average. Synthetic fiber production in 1987 declined 2 percent from 1986.
(Yuri Markish and Kathryn Zeimetz)

Agricultural Imports

Soviet agricultural imports in 1989 will exceed 1988's estimated $16.5 billion, perhaps by over 10 percent, and possibly reach the 1980-85 average (table 29 and figure 20). Grain import expenditures could be more than twice 1987's 9-year low, primarily because of sharply higher unit costs, but also because of higher import volumes. Unit values of grain imports could rise 20 percent in 1989, on top of the 30-percent increase in 1988. The dollar value of Soviet grain imports rose in 1988 by about 50 percent, as import volume also increased. The share of grain in the total value of Soviet agricultural imports was 35 percent in 1980-85, 17 percent in 1987, an estimated 24 percent in 1988. It could approach 30 percent in 1989.

Grain, purchased mainly from the West with hard currency, should replace sugar, obtained predominantly from Cuba, as the Soviets' main agricultural import in 1989. Imports of livestock products in 1989 may increase to the 1987 level (tables 30 and 31). The dollar value and quantities of meat and sugar imports probably fell in 1988. The value of oilseeds and meal imports may continue to rise from 1984's 5-year low, primarily because of higher prices in 1989.

The Soviets continue to rely heavily on Eastern Europe for meat, fruit, and vegetable imports (table 32).

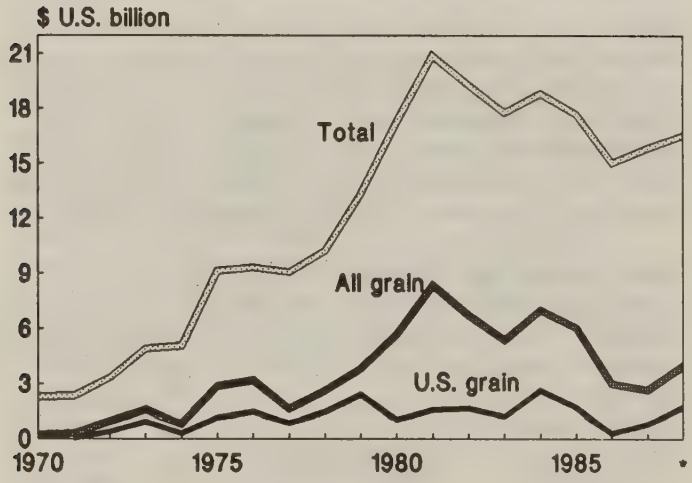
Table 29--USSR agricultural import summary, by value 1/

Commodity	1986	1987	1988 2/
	$ Millions		
Grain and products	2,992	2,669	4,000
Sugar	4,620	4,841	4,500
Livestock and products 3/	2,146	2,504	2,200
Fruits, vegetables, and nuts	1,711	1,652	1,600
Coffee, tea, cocoa, and beverages	1,345	1,240	1,250
Tobacco and products	898	932	900
Oilseeds and oilmeal 2/	550	949	1,200
Fats and oils	342	585	400
Cotton	130	137	150
Other	302	316	300
Total	15,036	15,825	16,500

1/ Derived from USSR official data converted at $1.42 for 1986 and $1.58 for 1987. 2/ Estimates with an exchange rate of $1.65 for 1988. 3/ Includes furs, raw hides, wool, and animal fats including butter.

Figure 20

USSR Agricultural Imports



*Estimates.

Table 30--USSR agricultural imports, by value

Commodity	1985	1986	1987
	$ Millions 1/		
Wheat	2,992.4	1,765.0	1,547.4
Barley	422.2	253.9	166.2
Corn	2,328.5	835.5	741.5
Other grain	65.5	10.6	3.8
Sorghum	141.7	3.2	3.8
Wheat flour	44.3	36.2	35.2
Rice, milled	49.8	87.6	171.3
Subtotal	6,044.4	2,992.0	2,669.2
Animals for slaughter	88.3	86.8	112.1
Breeding animals	16.3	24.9	24.8
Meat and meat products	1,026.2	1,287.2	1,387.6
Milk and milk products	90.6	115.1	103.7
Eggs and egg products	16.8	21.1	12.6
Animal fats including butter	289.9	147.3	212.8
Wool	465.4	458.6	641.9
Furs	3.1	2.9	3.6
Raw hides	21.9	1.8	4.7
Vegetables and potatoes	477.0	590.7	607.8
Fruit and berries, fresh	414.3	570.2	464.1
Fruit, dried	84.6	98.5	124.5
Fruit and berries, processed	217.9	307.3	280.7
Nuts	123.8	144.2	175.4
Sugar, raw	4,033.7	4,614.0	4,833.7
Sugar, refined	38.0	6.3	7.7
Coffee, cocoa, tea	898.6	859.2	846.9
Spices	66.9	85.6	89.8
Beverages	782.1	485.8	392.8
Tobacco, raw	279.3	240.8	236.1
Tobacco products	564.9	657.2	695.5
Natural fibers	334.7	151.1	166.3
Oilseeds	247.6	477.2	379.4
Oilseed meal 2/	114.8	73.1	569.3
Tapioca	11.6	19.3	0
Vegetable oils	591.1	209.8	439.6
Technical fats and oils	185.5	132.2	145.5
Seeds and planting materials	170.3	176.3	196.9
Total	17,699.6	15,036.6	15,825.0

1/ USSR official data converted at $1.20 in 1985, $1.42 in 1986, and $1.58 in 1987. 2/ Estimates.

Export Earnings

Total Soviet exports were 67 billion rubles in 1988 (table 33). The dollar value of Soviet hard (convertible) currency exports increased an estimated 5 percent.[123] Although the value of Soviet fuel exports to hard currency countries probably fell in 1988, nonfuel exports (particularly other nonfood raw materials) are estimated to have risen by an even greater amount. Thus, as in 1987, Soviet hard currency trade was in surplus, at an estimated $4 billion. Because fuel comprises a larger share of Soviet exports to developed Western countries than to all hard currency nations, the fall in fuel export earnings helped create a Soviet trade deficit with the developed West in 1988, perhaps as high as $4 billion.[124]

Since 1985, Soviet export earnings have suffered from the dual problems of depressed world energy prices and the fall in the value of the U.S. dollar. Soviet oil exports to hard currency countries, as well as most exports of natural gas, are priced in dollars, whereas the bulk of Soviet hard currency imports are not dollar-priced. The dollar's fall thus reduces the real purchasing power of the USSR's main hard currency-earning exports.

In 1988, the trade-weighted exchange rate of the dollar fell by about 4 percent. (The dollar depreciated against the ruble by 6 percent in the Soviet official exchange rate.) The drop in Soviet fuel export prices to nonsocialist nations was greater--around 17 percent from

[123] *PlanEcon Review and Outlook*, January 1989, p. 27.

[124] *Ibid.*

Table 31--USSR agricultural imports, quantities of principal items

Commodity	1985	1986	1987
	1,000 metric tons		
Wheat	21,400	15,700	18,097
Barley	3,700	3,613	3,020
Corn	18,600	7,236	9,238
Other grain	500	208	30
Sorghum	1,452	39	58
Wheat flour 1/	264	271	304
Rice, milled	127	363	488
Subtotal	46,043	27,430	31,235
Meat and meat products 2/	857	936	858
Shell eggs 3/	378	387	196
Butter	276	194	403
Wool, scoured	109	115	134
Vegetables, fresh	190	271	254
Vegetables, canned	472	464	422
Fruit, fresh	1,122	1,269	926
Fruit, dried	81	91	81
Sugar, raw	4,305	5,158	5,035
Sugar, refined	195	23	20
Coffee	57	39	58
Cocoa beans	155	163	148
Tea	108	110	135
Tobacco	95	67	61
Cotton lint	187	88	75
Tapioca	208	297	0
Oilseeds	924	2,062	1,927
Oilseed meal 4/	696	375	3,350
Vegetable oil, edible	813	451	825

1/ Flour in wheat equivalent at 72 percent. 2/ Does not include live animals. 3/ Million pieces. 4/ ERS estimate.

January through September.[125] The Soviets responded by increasing the net volume of oil exports to these countries, perhaps by as much as 20 percent (the gross volume rose by more, because the Soviets were re-exporting oil purchased from the Middle East).

World oil prices, however, have been rising since November 1988, as both OPEC and non-OPEC oil-exporting countries have taken effective action to increase prices (figure 21). A barrel of Saudi light oil that sold for as low as $9.50 in mid-November 1988 was bringing more than $15 by March 1989. The Soviets have announced they will help prop up prices, by cutting oil exports to convertible currency countries in the first half of 1989 by 5 percent (about 100,000 barrels a day). The percentage increase in oil export unit values in 1989 should exceed 5 percent, which means Soviet hard currency earnings from oil exports should rise, thus increasing purchasing power for hard currency goods.

The decline in import prices of grain and, to a lesser degree, oilseeds during 1984-87 has partially mitigated the harm to the Soviets from low energy prices and the dollar's fall. High levels of production and increased competition among foreign suppliers drove the unit value of grain imports in 1987 to about half that in the early 1980's. Although average grain import prices in 1988 rose an estimated 29 percent and could increase 20-25

[125] *PlanEcon Report*, Vol. V, No. 1 (1989), p. 1.

Table 32--Major suppliers of selected agricultural goods to the USSR in 1987

Commodity	Quantity	Supplier and share
	1,000 metric tons	(Percent)
Grain and products 1/ 2/	31,235	United States (29), EC (23), Canada (20), Argentina (6), China (5), Hungary (4), Australia (3), and others (10)
Sugar 3/	4,632	Cuba (74), Brazil (8), Australia (4), Thailand (2), Nicaragua (2), and others (10)
Fresh/frozen red meat	514	Hungary (27), Romania (19), France (8), Mongolia (7), New Zealand (6), Finland (2), Ireland (1), and others (30)
Poultry	169	Hungary (76), Romania (14), Bulgaria (7), and others (3)
Wool, scoured	134	Australia (61), New Zealand (18), Argentina (7), Uruguay (6), Mongolia (5), Turkey (1), Afghanistan (1), and Syria (1)
Soybeans	1,534	China (52), Argentina (41), United States (5) and others (2)
Soybean meal 2/	3,252	Argentina (30), Brazil (28), FRG (15), United States (8) and others (19)
Fresh fruit and berries	926	Hungary (28), Cuba (20), Egypt (11), China (10), Poland (5), Greece (4), Bulgaria (4), Morocco (3), Turkey (3), and others (12)
Dried fruit	81	Afghanistan (59), Iran (13), Romania (10), Turkey (9), and others (9)
Fresh vegetables	254	Poland (43), Bulgaria (28), Romania (8), Vietnam (7), Egypt (6), and others (8)
Cotton lint	75	China (56), Egypt (20), Syria (17), Afghanistan (4), Greece (2), and others (1)

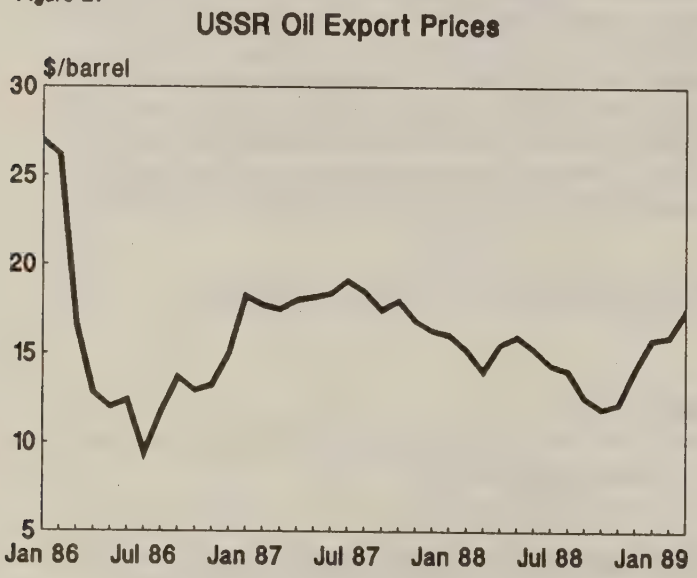
1/ Grain includes all major grains, rice, and flour in wheat equivalent at 72 percent. 2/ Estimate. 3/ Total Soviet sugar imports in terms of refined value converted at 0.92.

Table 33--USSR foreign trade

Direction	1986	1987	1988
	Billion rubles 1/		
Exports to	68.3	68.1	67
Socialist countries 2/	45.6	44.2	NA
Western industrialized countries	13.1	14.2	NA
Developing countries	9.6	9.8	NA
Imports from	62.6	60.7	65
Socialist countries 2/	41.8	42.1	NA
Western industrialized countries	15.9	13.9	NA
Developing countries	4.9	4.7	NA

1/ In the USSR official exchange rate, a ruble equaled $1.42 in 1986, $1.58 in 1987, and $1.65 in 1988. 2/ Includes Eastern Europe, Cuba, Mongolia, North Korea, PRC, and Vietnam.

Figure 21



percent again in 1989, prices in 1989 should still be well below levels earlier in the decade.

Higher convertible currency earnings from oil exports and also Western credits in 1988 of $10-$12 billion (though none from U.S. creditors) should help pay for agricultural imports. Although the credits are earmarked for purchases of machinery and nonfood consumer goods from the lending nations, they should free up some funds for agricultural imports. The Soviet gold stock is estimated to be worth $30-$35 billion, and the USSR has extended to hard currency Third World countries export credits totaling $50-$55 billion (though because of loose terms, these credits probably have a real value of only half this amount).[126] The low value of the dollar should continue to give U.S. agricultural exports some advantage in the Soviet market.

[126]*PlanEcon Review and Outlook*, January 1989, p. 11.

Many Soviet economists have been arguing that, even if hard currency is not a serious constraint, the goals of perestroika would be better served if less convertible currency were used to purchase agricultural goods. Much imported grain is sold to farms at subsidized prices, which augments the State's yawning budget deficit, whereas imported nonfood consumer goods can be sold at relatively high prices, which would help reduce the deficit.

Soviet agricultural exports in 1988 are estimated to be between $2.8 billion, 1987's figure, and $3 billion. Cotton lint should continue to account for almost half the export value, and should rise in both volume and value because of the good 1988 harvest (tables 34 and 35).

Trade Reforms

Efforts in 1988 to decentralize foreign trade decisionmaking in agriculture have apparently met with little success. One reason is that the Ministry of Foreign Economic Relations continues to control trade in the key bulk commodities, from energy to grain, oilseeds, and meat and dairy products. In early 1988, the right to engage directly in foreign trade for a wide range of nonbulk products was granted to State and collective farms, agroindustrial enterprises, and foreign trade

Table 34--USSR agricultural exports, by value

Commodity	1985	1986	1987
		$ Millions 1/	
Wheat	189.3	133.1	145.1
Barley	16.4	3.5	2.6
Corn	27.0	18.0	17.6
Oats	1.9	1.5	0.8
Rye	--	0.8	2.0
Rice	4.6	12.4	17.2
Flour-milling products and pulses	141.8	160.9	136.7
Subtotal	381.0	330.2	322.0
Meat and products	39.6	47.9	58.3
Milk and products	43.5	48.2	55.4
Animal fats including butter	69.5	79.0	94.5
Wool	24.8	45.4	44.0
Furs	135.4	145.3	226.6
Raw hides	39.9	64.9	130.8
Vegetables, fruit, and nuts	42.5	47.2	77.1
Sugar, refined	36.3	82.1	48.4
Confectioneries	8.4	8.5	9.4
Beverages	92.9	176.4	199.7
Tobacco products	5.8	6.5	6.6
Oilseed, tobacco, and other raw materials	70.8	51.2	41.2
Natural fibers	1,033.4	1,174.2	1,442.9
Vegetable oils	82.4	76.0	68.8
Technical fats and oils	8.4	2.9	5.0
Seeds and planting materials	48.5	42.6	42.7
Total	2,163.1	2,428.5	2,872.4

1/ USSR official data converted at $1.20 in 1985, $1.42 in 1986, and $1.58 in 1987.

Table 35--USSR agricultural exports, quantities of principal items

Commodity	1985	1986	1987
	1,000 metric tons		
Wheat	1,325	1,181	1,460
Barley	145	42	39
Corn	266	212	251
Oats	15	15	6
Flour 1/	307	252	250
Groats	379	541	354
Pulses	64	66	7
Rice 2/	15	63	68
Subtotal	2,516	2,372	2,435
Meat and products	27	28	35
Butter	17	16	20
Wool	11	28	27
Sugar, refined	164	301	159
Tea	18	5	5
Cotton, lint	659	713	783
Flax	34	20	32
Vegetable oil, edible	135	141	118
Starch	26	23	24

1/ Flour in wheat equivalent at 72 percent. 2/ Sum of Soviet country-specific data.

organizations at the republic level. In practice, though, they have had little decisionmaking independence. In particular, central trade authorities have retained considerable power over determining trade prices, which can hamstring the efforts of these lower bodies to trade freely.

Although much of the control exercised by the central trade authorities is no doubt unnecessary and counterproductive, their continued authority can be justified to some degree by the country's failure to reform its flawed domestic price system. Trade decentralization makes sense only if the Soviets wish to see trade driven according to the principles of comparative advantage (by which the country would export goods that are relatively inexpensive to produce domestically and import those with relatively high domestic costs of production), as opposed to using trade primarily to obtain goods of insufficient short-run supply.

Gainful trade guided by comparative advantage can only occur, though, if domestic prices of traded goods are "rational"--that is, based on marginal costs that include all opportunity costs of production (such as that of capital). Soviet prices for most goods fall far short of this standard. With domestic prices such poor measures of marginal costs, Soviet farms and enterprises might engage in foreign trade transactions that are to their financial benefit, but to the detriment of the country. This could occur if enterprises exported goods whose domestic prices severely understated marginal costs, or imported goods whose domestic prices heavily exceeded domestic marginal costs. Until Soviet prices become acceptable guides to rational foreign trade decisionmaking, the central trade authorities have at least one good argument for retaining power.

Important changes involving Soviet foreign economic relations were announced in a resolution by the USSR Council of Ministers in December 1988.[127] To encourage joint ventures, the Soviets made a number of major concessions. These include dropping the requirement that the Soviets retain majority shareholding and control of the directorship. Also, labor laws and tariffs on imported inputs were eased for joint ventures. All terms are now apparently negotiable. Nonetheless, joint venture firms still face the serious problems of repatriating profit in hard currency, establishing reliable sources of supply with Soviet producers, and reconciling differences in Western and Soviet accounting practices. The Soviets are strongly pushing joint ventures, which can exasperate Western firms more interested in conventional trade.

The resolution also announced that in January 1990 the ruble would be devalued by 50 percent, with further substantial devaluation likely in 1991. The devaluation is intended initially to affect only commercial transactions; a higher rate will be used for tourism. A related change is that the Government is to begin auctioning off a limited amount of foreign exchange to Soviet enterprises and joint ventures.

The Soviets claim that ruble devaluation is the first step toward full ruble convertibility. In at least the short to medium term, the devaluation(s) should reduce Western prospects for both conventional trade and joint ventures that focus on selling to the Soviet domestic market. The devaluation will of course raise the ruble price of Western imports. Joint ventures that use primarily Soviet inputs to produce hard-currency earning exports will benefit. Those, however, that rely heavily on imported inputs and produce for sale in the USSR could be seriously hurt. This should dull the enthusiasm of Western firms whose image of a successful joint venture is one that uses superior Western inputs and management to outperform and outclass Soviet domestic competition. Rather, to be successful, most joint ventures will probably have to use lower quality Soviet inputs to produce high-quality goods (or services) competitive on the world market, a much greater challenge. *(William M. Liefert)*

U.S. Exports

U.S. agricultural exports to the USSR continue to recover from 1986's 13-year low and may be record-high in 1989. Substantially larger corn exports and much higher wheat prices will push 1989 exports to the USSR well above 1988's $2.246 billion. Exports in 1988 were 2.4 times 1987 and were exceeded only in 1979 and 1984 (tables 36 and 37).

[127] *Ekonomicheskaya gazeta*, No. 51 (December 1988), pp. 17-18, translated in FBIS-SOV-88-250, December 29, 1988, pp. 61-68.

Table 36--U.S. trade with the USSR

Year	U.S. exports Total	U.S. exports Agricultural	U.S. imports Total	U.S. imports Agricultural
		$ Millions		
1972 1/	572	459	88	4
1973 1/	1,287	1,017	204	5
1974 1/	631	324	335	9
1975 1/	1,871	1,170	243	7
1976 1/	2,424	1,605	214	8
1977 1/	1,637	1,053	221	11
1978 1/	2,328	1,765	529	12
1979 2/	3,749	3,000	873	15
1980 2/	1,601	1,138	432	10
1981 2/	2,450	1,685	357	12
1982 2/	2,605	1,871	229	11
1983 2/	2,002	1,473	341	10
1984 2/	3,343	2,878	556	11
1985 2/	2,460	1,923	407	9
1986 2/	1,257	658	557	17
1987 2/	1,492	938	408	22
1988 2/	2,849	2,246	564	19

1/ Total and agricultural exports adjusted for grain and oilseed transshipments through Canada, West Germany, Belgium, and the Netherlands. 2/ Total and agricultural exports adjusted for grain and oilseed transshipments through Canada.

Table 37--U.S. agricultural trade with the USSR, by value

Commodity	1986	1987	1988 1/
		$ Millions	
Exports 2/			
Wheat	--	392.5	755.1
Corn	290.7	393.2	961.8
Soybeans	313.0	42.7	163.6
Soybean meal	--	57.5	246.3
Vegetable oil	--	--	--
Fruit, nuts, and berries	37.6	27.4	46.8
Cotton	--	--	31.0
Tallow, inedible	15.5	18.8	26.4
All other	0.7	6.0	15.4
Total	657.5	938.1	2,246.4
Imports			
Casein and mixture	0.6	0.5	.8
Furskins	14.4	19.9	16.8
Other animal products	0.2	0.9	0.5
Tobacco fillers	0.5	--	--
All other	0.6	0.5	0.7
Total	16.6	21.9	18.8

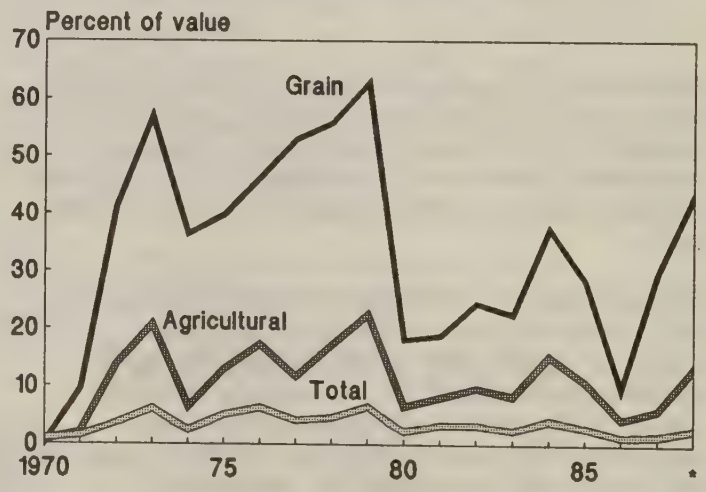
-- = negligible or none. 1/ Preliminary. 2/ Includes transshipments through Canada.

The United States could further increase its share of Soviet grain imports in 1989. In 1988, the U.S. share reached an estimated 44 percent of value and 46 percent of volume, up from 29 and 33 percent in 1987 (figure 22). The United States captured an estimated 14 percent of total Soviet agricultural imports in 1988. The USSR took 12 percent of the value of all U.S. grain and feed exports in 1988. With 6 percent of the total, the USSR remains the third largest market for U.S. agricultural exports (figure 23).

In 1989, wheat's share of all U.S. grain sent to the USSR should fall below its 1988 volume of 48 percent (table 38). In the first quarter of 1989, wheat exports were 2.6 million tons, compared with 5.0 million tons in the first quarter of 1988 and 8 million for the year. The unit values for the wheat exports in the first quarter of 1989 averaged $152 per ton, versus $94 for all of 1988. All wheat sales to the USSR from 1987 through May 1989 have been under the Export Enhancement Program (EEP). Corn sales in early 1989 already exceed 1988's total exports of 8.5 million tons, with 4.8 million tons shipped in the first quarter of 1989 versus 0.7 million in the same months of 1988. The unit values for corn exports were $121 per ton, versus $113 for calendar 1988.

Figure 22

U.S. Share of Soviet Imports



*Estimates.

Figure 23

USSR Share of U.S. Exports

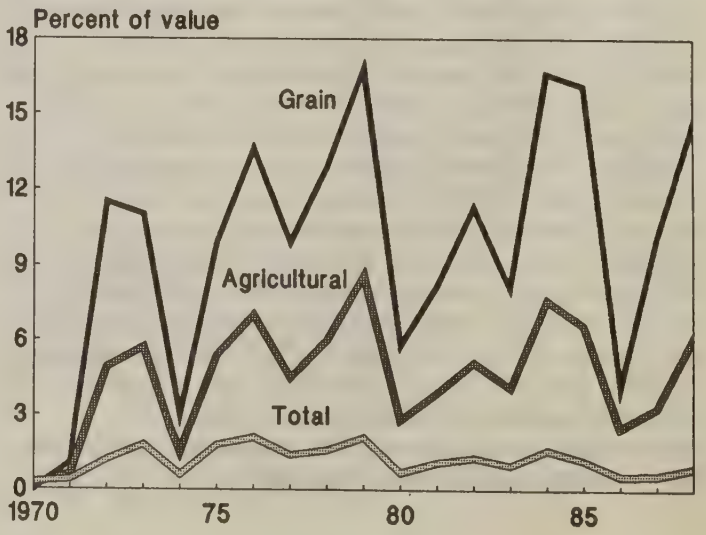


Table 38--U.S. agricultural trade with the USSR, by quantity

Commodity	1986	1987	1988 1/
	1,000 metric tons		
Exports 2/			
Wheat	--	4,847.2	8,034.0
Corn	2,671.2	5,319.9	8,521.7
Soybeans	1,518.6	221.3	750.3
Soybean meal	--	270.9	1,122.0
Vegetable oil	--	--	--
Almonds, shelled	12.	7.6	15.7
Cotton, excluding linters	--	--	21.8
Tallow, inedible	50.0	54.9	65.0
Tobacco, raw	--	--	--
Imports			
Tea	0.1	--	--
Casein and mixture	0.3	0.3	0.2
Tobacco, unmanufactured	0.1	--	--
Beverages 3/	0.8	0.6	.4

-- = negligible or none. 1/ Preliminary.
2/ Includes transshipments through Canada.
3/ Excludes fruit

Soybean and soybean meal exports to the USSR in 1989 could remain near 1988's 1.7 million tons (soybean meal equivalent) and $410 million. The United States exported cotton to the USSR for the first time since 1985, almost all during the first half of the year, as the Soviets dealt with the poor quality of their 1987 crop.

Tallow is overwhelmingly the primary U.S. animal product export to the USSR. The United States shipped the Soviets 65,000 tons in 1988, about 7 percent more than the 1980-87 annual average. The export unit value of the tallow was up almost 20 percent from 1987. Hides and skin sales averaged $10 million in 1983-84, and $5 million of poultry were sold in 1982.

With the large increase in farm exports to the USSR in 1988, agriculture's share of total exports to the USSR rose to over 80 percent, up from 63 percent in 1987. Nonagricultural exports increased 9 percent. Fertilizer's portion continued to fall, from 66 percent of nonagricultural exports in 1986 to 37 percent in 1988.

Agricultural goods account for only a small portion of total U.S. imports from the USSR, 3 percent in 1988. Sable skins accounted for over 80 percent of agricultural imports from the USSR in 1988. Petrochemicals accounted for about 35 percent of nonagricultural imports from the USSR, precious elements and compounds about 20 percent, anhydrous ammonia over 10 percent, and vodka 4 percent. *(Kathryn Zeimetz)*

Grain Imports

Soviet grain imports in marketing year 1989/90 (July-June) will primarily depend on 1989 domestic grain and forage quality and production and grain procurements, with hard currency availability and world prices also playing major roles. The projected increase in Soviet coarse grain output in 1989 may reduce total feed grain imports by about 15 percent from 1988/89. The likely decline in Soviet coarse grain imports could cut U.S. corn sales to the USSR. Soviet barley imports might also be curtailed with an improved Soviet barley crop. However, the potential lack of cheap feed-quality wheat could offset this. An increase in Canadian output should place it back in the market. Decreased import demand for feed grains could be mitigated by the projected weakening of prices from the 1988/89 3-year high and continued Soviet priority on raising output of livestock products (figure 24). The forecasted increase in Soviet wheat production in 1989 could cut import needs somewhat. However, the quality of wheat, more than the volume, will weigh most in determining wheat import needs next year.

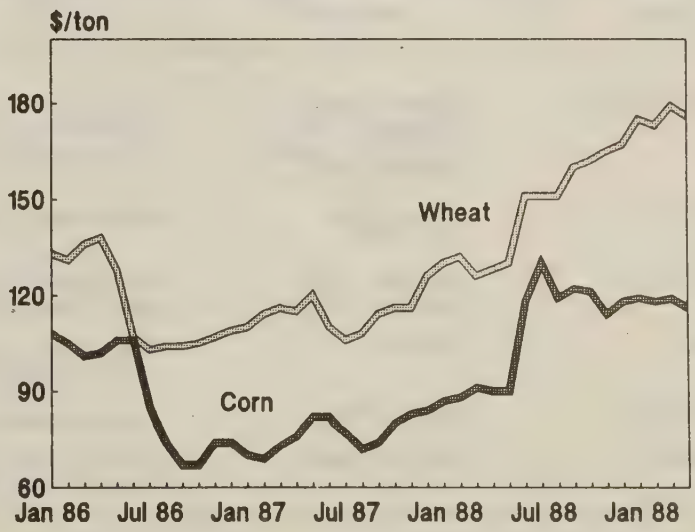
If the United States maintains competitive prices, it should be able to maintain a 25-percent or more share of the Soviet wheat market in 1989/90. The quality and size of wheat production in 1989 will largely determine the volume of exports from the EC, Argentina, and Canada.

Total Soviet grain imports in 1988/89 will be the third highest ever, up 6.5 million tons from 1987/88 and the greatest since the record 55.5 million tons purchased in 1984/85. Soviet grain imports in July-December 1988 increased about 25 percent from the same period in 1987, reflecting much greater Soviet activity in the U.S. corn market. The pace of Soviet purchasing during January-June 1989 is about 25 percent ahead of last year.

The estimated U.S. share of the Soviet grain market in 1988/89 likely remained about the same as last year's 50 percent. While the EC's 20 percent share is estimated to be largely unchanged, the Canadian share was more than halved for the second consecutive year, falling to about 5 percent, largely because of drought-reduced supplies.

Figure 24

U.S. Gulf Prices for Grain



Argentina's estimated share rose slightly to about 5 percent. Australia's share remained negligible for the second year, in sharp contrast with its 5-10 percent share in 1979/80-1986/87.

Grain Agreement

In November 1988, the second U.S.-USSR 5-year Long-Term Grain Agreement (LTGA), which expired in September 1988, was extended through December 31, 1990. The 27-month extension, reached after six negotiating sessions, means subsequent agreements could run concurrently with the USSR's 5-year planning process. The two LTGAs to date specified grain purchases on a U.S. fiscal year basis (October-September). The terms of the extension are exactly the same as for the LTGA, with the annual amount to be purchased prorated for the 3-month period in excess of 2 years. The drawn-out LTGA negotiations centered on differences over the minimum and maximum purchase requirements, pricing procedures, agreement flexibility, and commodity inclusion, and also included overall bilateral trade differences such as balancing trade, removing trade barriers, and revising shipping regulations.

The LTGA provides that the USSR may purchase up to 12 million tons of U.S. corn and wheat without prior consultations with the United States (table 39). However, the United States raised the LTGA's 1988/89 consultation level, to 16 million tons in December 1988, 20 million in January 1989, and 24 million in April 1989.

The Soviets have already more than fulfilled the LTGA minimum purchase requirements for 1988/89, having purchased a record amount (table 40). During the last 5-year period, the USSR breached the terms of the agreement for 3 consecutive years (1984/85-1986/87), purportedly because U.S. wheat prices were not considered competitive with other prices on the world market. The Soviets stepped up their purchases of U.S. wheat beginning in 1987 after the United States offered wheat under the EEP. The EEP was created to increase the competitiveness of U.S. commodities vis-a-vis subsidized sales by other countries.

Corn Sales

Soviet coarse grain imports in 1988/89 (July-June) are estimated at 23 million tons, the highest in 4 years and more than double last year (figure 25). The surge in demand can be largely explained by reduced Soviet coarse grain and forage production in 1988, only small improvement in protein feed supplies, and continued priority given to raising output of livestock products.

U.S. corn sales to the USSR in 1988/89 (July-June) are estimated at four times last year's approximately 4 million tons, and a record high. The Soviet Union should be the top buyer of U.S. corn in 1988/89. The U.S. share of Soviet coarse grain imports may exceed 70 percent, compared with about 40 percent in 1987/88. Moreover, increased corn prices this season will boost the value of sales even further. The Soviets made their first significant purchase of U.S. sorghum in 1988/89, buying over 750,000 tons to date.

The Argentine portion of the market remained about the same as 1987/88's 5 percent. Although Argentina's prices were competitive with U.S. f.o.b. prices, drought-reduced 1988/89 grain supplies constrained sales and will mean another shortfall in meeting the terms of the Argentine-Soviet grain agreement.

Although EC barley sales to the USSR were up a third from last year, the EC's share of the Soviet feed grain market fell to about 15 percent in 1988/89. The drop in market shares largely reflected the USSR's preference

Table 39--USSR long-term agricultural purchase agreements

Country	Duration	Terms
United States	October 1983-September 1988 (extended through December 1990)	Minimum of 9 million tons of grain, including 4 million of wheat, 4 million corn, and 1 million wheat or corn or soybeans/meal (1 ton soy= 2 tons grain); 12-million-ton maximum unless raised by United States
Canada	August 1986-July 1991	25 millions tons of wheat and feed grains over the 5 years
Argentina	December 1986-November 1991	Minimum of 4 million tons of coarse grains, including 2 million corn, 2 million sorghum; and 500,000 soybeans
PRC	1986-1990	As part of an overall bilateral trade protocol, 7.5 million tons of corn and 2.6 million tons of soybeans over 5-year period
France	Not available	Trade protocol calling for purchases of wheat; details unknown
Hungary	Not available	Details unknown; formerly a 5-year trade protocol called for 500,000 tons of wheat and corn annually, not binding in event of poor harvest

for corn, which has a higher feed value and was selling at prices competitive with barley. Exports of Canadian barley may have fallen to zero because of the drop in domestic production. The PRC's exports to the Soviet Union likely remained at about 1.5 million tons, in line with agreement commitments.

Table 40--U.S. grain sales to the USSR

Year 1/	U.S. offer to sell	USSR purchases from U.S. Wheat	Corn	Total
		Million tons		
1976/77	2/ 8	3.1	3.1	6.1
1977/78	15	3.5	11.1	14.6
1978/79	17	4.0	11.5	15.5
1979/80	3/ 25	2.2	5.8	7.9
1980/81	14	3.8	5.7	9.5
1981/82	23	6.1	7.8	13.9
1982/83	23	3.0	3.2	6.2
1983/84	22	7.6	6.5	14.1
1984/85 4/	22	2.9	15.8	18.6
1985/86	22	.2	6.8	7.0
1986/87	12	4.1	4.1	8.2
1987/88	No maximum	9.0	5.5	14.6
1988/89 5/	24	4.1	15.0	19.1

1/ Grain agreement year--October/September. 2/ Soviets were also told that the 1976 U.S. grain crop could meet needs in excess of this. 3/ U.S. offer later withdrawn. 4/ Total does not add because of rounding. 5/ As of May 9, 1989.
Source: U.S. Export Sales.

Wheat Imports

The increased quality and output of the 1988 Soviet wheat crop reduced imports of foreign wheat in 1988/89 (figure 26). A roughly 20-percent increase in Soviet domestic procurements of food-quality wheat in 1988 largely explains the nearly 30-percent drop in 1988/89 wheat imports.

U.S. wheat exports to the USSR in 1988/89 are estimated to be down about 60 percent from the record of over 12 million tons last year. Above-average U.S. sales in 1987/88 resulted from the poor 1987 Soviet wheat crop, limited supplies of high quality wheat among U.S. competitors, generally low world prices, and the extension of EEP bonuses. Wheat prices perhaps 35 percent higher this year because of drought-reduced world supplies should partly offset the reduced quantity of U.S. exports in 1988/89. The U.S. share of the Soviet wheat market likely fell from over half in 1987/88 to about a third in 1988/89.

Figure 25

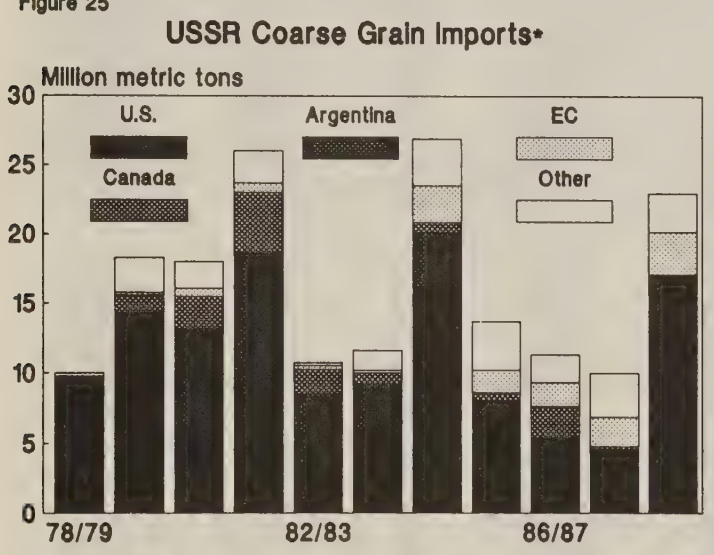
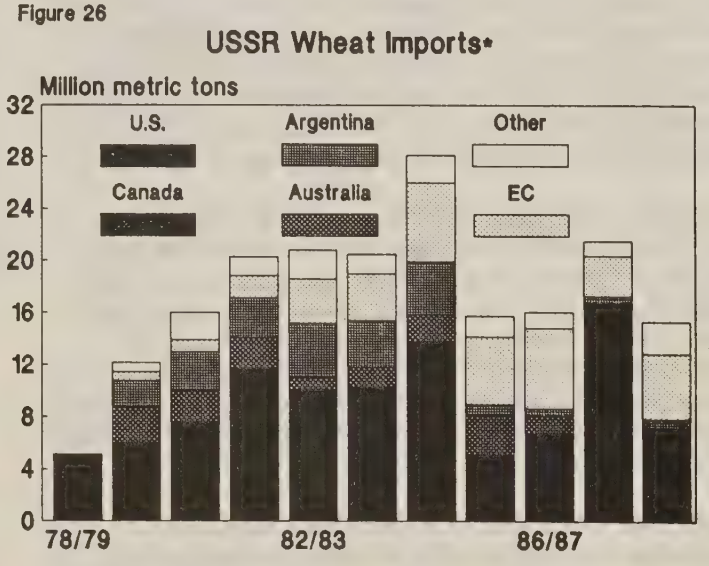


Figure 26



Stimulated by U.S. EEP bonuses, the Soviets already purchased more than the required 4-million-ton minimum of wheat specified in the LTGA during the 1988/89 (October-September). As of May 5, USDA had offered the Soviet Union 5.5 million tons of wheat under EEP for purchase during LTGA year 1988/89, with bonuses averaging about $23 per ton on the first 4 million tons. Bonuses averaged about $32 per ton on sales in 1987/88, and about $42 in 1986/87 (table 41). Bonuses on EEP wheat sales in 1986/87 and 1987/88 totaled about $450 million, and so far in 1988/89 nearly $100 million. The USSR received the most U.S. EEP wheat initiatives of any country in fiscal 1988, and the most as of May 5 in fiscal 1989.

Although the EEP has increased the competitiveness of U.S. wheat prices for the USSR, the EC (against which the EEP has been primarily targeted) has been able to recoup most of its earlier share of the market in 1988/89. The EC's share of Soviet wheat imports is estimated at about one-third, double its 1987/88 share. Its record share was 39 percent in 1986/87.

A major reason for the rise in 1988/89 EC wheat sales was the substantial improvement in the quality of its 1988 crop. However, EC subsidies on wheat sales, over three times the value of EEP bonuses, have also played a large role. While U.S. EEP wheat sold for $152-$154 per ton in February 1989, the EC reportedly sold subsidized wheat for around $144 per ton, after discounts of more than $70 per ton. Moreover, shipping costs are generally much less from Europe than from the United States, increasing the attractiveness of EC wheat.

Canadian wheat sales also fell in 1988/89, owing to decreased Soviet imports and drought-reduced domestic supplies. Canada's market share was near a record low. Argentina's wheat exports were about the same as last year, with its market share remaining in the low 3-5 percent range for the fourth year. Although both countries have grain agreements with the USSR, wheat is not included in Argentina's, and no annual sales level is specified in Canada's.

Australian wheat exports to the USSR may have remained negligible in 1988/89, down markedly from average annual sales of about 2 million tons during 1979/80-1986/87. On the other hand, an improved 1988 wheat crop in Eastern Europe helped increase its market share. *(Christian J. Foster)*

Table 41--U.S. EEP wheat purchases by the USSR 1/

Date	Amount	Type 2/	Bonus rate	Total bonus
	Tons		$/ton	$
1986/87				
May	700,000	HRW	44.14	30,898,000
May	250,000	HRW	44.14	11,035,000
May	50,000	HRW	45.08	2,254,000
May	200,000	HRW	44.40	8,880,000
May	250,000	HRW	44.40	11,100,000
May	150,000	HRW	39.99	5,998,500
May	400,000	HRW	40.27	16,108,000
May	500,000	HRW	40.19	20,095,000
May	500,000	HRW	40.19	20,095,000
May	500,000	HRW	39.63	19,815,000
May	500,000	HRW	39.63	19,815,000
1987/88				
Oct.	65,000	HRW	38.36	2,493,400
Nov.	500,000	HRW	30.20	15,100,000
Nov.	450,000	HRW	29.16	13,122,000
Nov.	650,000	HRW	33.57	21,820,500
Nov.	57,000	HRS	33.57	1,913,490
Nov.	50,000	HRW	35.38	1,769,000
Dec.	500,000	HRW	37.75	18,875,000
Dec.	250,000	HRW	39.89	9,972,500
Dec.	700,000	HRW	41.24	28,868,000
Dec.	100,000	HRS	41.24	4,124,000
Dec.	800	HRS	39.61	31,688
Dec.	25,000	HRS	33.66	841,500
Dec.	700,000	HRW	42.05	29,435,000
Dec.	25,000	HRS	42.05	1,051,250
Dec.	350,000	HRW	41.75	14,612,500
Dec.	50,000	HRS	41.75	2,087,500
Dec.	342,000	HRS	40.05	13,697,100
Dec.	300,000	HRW	37.10	11,130,000
Feb.	500,000	HRW	27.48	13,740,000
Feb.	500,000	HRW	28.35	14,175,000
Feb.	200,000	HRS	28.35	5,670,000
Mar.	100,000	HRS	27.00	2,700,000
Mar.	400,000	HRW	27.00	10,800,000
Mar.	475,000	HRW	21.95	10,426,250
Mar.	25,000	HRW	21.46	536,500
Apr.	440,000	HRW	19.79	8,707,600
Apr.	50,000	HRS	19.79	989,500
Apr.	200,000	HRW	21.61	4,322,000
Apr.	300,000	HRS	21.61	6,483,000
Apr.	325,000	HRW	24.70	8,027,500
Apr.	175,000	HRW	24.46	4,280,500
1988/89				
Dec.	420,000	HRW	21.75	9,135,000
Jan.	350,000	HRW	22.83	7,990,500
Jan.	40,000	DNS	22.83	913,200
Jan.	480,000	HRW	23.35	11,208,000
Jan.	50,000	DNS	23.35	1,167,500
Jan.	550,000	HRW	23.05	12,677,500
Jan.	85,000	DNS	23.05	1,959,250
Jan.	25,000	DNS	23.70	592,500
Feb.	600,000	HRW	23.01	13,806,000
Feb.	400,000	HRW	22.06	8,824,000
Mar.	375,000	HRW	22.46	8,422,500
Mar.	110,000	DNS	22.46	2,470,600
Mar.	400,000	HRW	22.70	9,080,000
Mar.	115,000	DNS	22.70	2,610,500
May	120,000	DNS	8.46	1,025,200
May	180,000	HRW	8.46	1,522,800
Total	17,104,800	--	3/ 31.65	541,290,828

1/ Sales as of March 30, 1989. 2/ HRW is hard red winter wheat, HRS is hard red spring wheat, and DNS is dark northern spring. 3/ Weighted average.

Imports and Procurements

Since 1980, a close relationship has held between State procurement of grain and Soviet grain imports. This relationship is stronger than the one between production and imports. As the harvest commences each year (usually in early July), the State begins purchasing grain from State and collective farms. By November, these purchases have basically come to a close until the next harvest.

The sum of published data on annual State grain procurement and July/June grain imports has been relatively stable since the beginning of this decade, fluctuating up and down only a few million tons around 106 million (figure 27 and table 42).

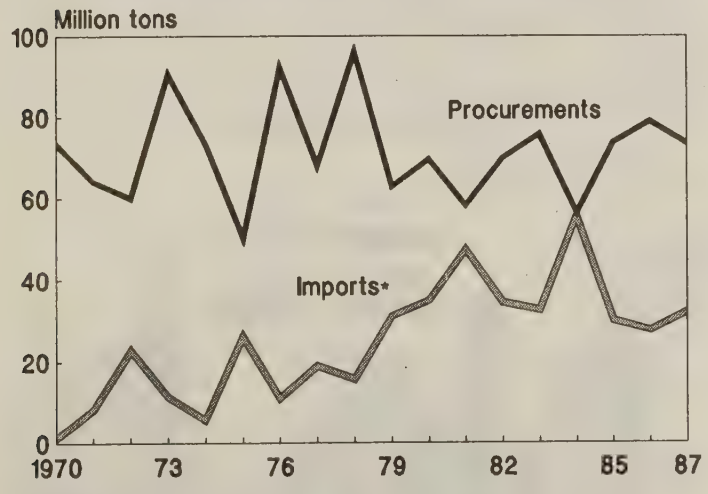
The largest deviation upward came in 1984/85, followed by the largest downward deviation in 1985/86. These deviations might be explained by overbuying in the spring of 1985, following Gorbachev's March appointment as General Secretary. A good deal of the movement in Soviet imports since 1980 can be explained by reference to procurements. Regression data indicate that with every 1-million-ton increase or decrease in State procurements of grain, grain imports decrease or increase by 1.15 million tons.

There are a number of reasons to explain stability in the sum of State procurements and imports since 1980. The Government uses grain primarily in the milling and mixed feed industries. Mixed feed production has increased, but most of the growth has been at local mixed feed plants and not at those that comprise the State mixed feed industry (figure 28). Growth in population has been largely offset by declines in per capita consumption of bread and grain products. The State-held grain supply is also responsible for additions to or subtractions from grain stocks (assuming that grain carryover stocks held on farms do not fluctuate much) and various other grain use categories.

Although grain import needs may be partly ascertainable from annual procurements, other factors also influence Soviet import decisions. Continued hard-currency constraints and deteriorating terms of trade could restrain Soviet purchasing activity. A change in policy, reverting to substantial drawdown of stocks to enhance current-year supplies, would result in less imports.

World grain supplies and prices must also be taken into account. On the other hand, the strong emphasis on raising livestock output and meeting the needs of the consumer, combined with inadequate domestic feed supplies, might outweigh hard-currency concerns. Furthermore, the extension of large credits to the USSR from the West could free up funds for grain purchases. *(Christian J. Foster and Edward C. Cook)*

Figure 27
USSR Grain Procurements Versus Imports



*July-June.

Table 42--USSR: Total grain procurements and imports 1/

Year	Procurements	Imports	Total
		Million tons	
1970	73.3	1.3	74.6
1971	64.1	8.3	72.4
1972	60.0	22.8	82.8
1973	90.5	11.3	101.8
1974	73.3	5.7	79.0
1975	50.2	26.1	76.3
1976	92.1	11.0	103.1
1977	68.0	18.9	86.9
1978	95.9	15.6	111.5
1979	62.8	31.0	93.8
1980	69.4	34.8	104.2
1981	58.1	47.3	105.4
1982	69.7	34.3	104.0
1983	75.6	32.5	108.1
1984	56.3	55.5	111.8
1985	73.5	29.9	103.4
1986	78.8	27.5	106.3
1987	73.3	32.0	105.3
1988	2/ 60	39	2/ 99

1/ Procurements are calendar year data from the Narodnoe khozyaistvo beginning with 1970; the imports are July/June USDA estimates beginning with July 1970.
2/ ERS estimate.

Figure 28

USSR Mixed Feed Production

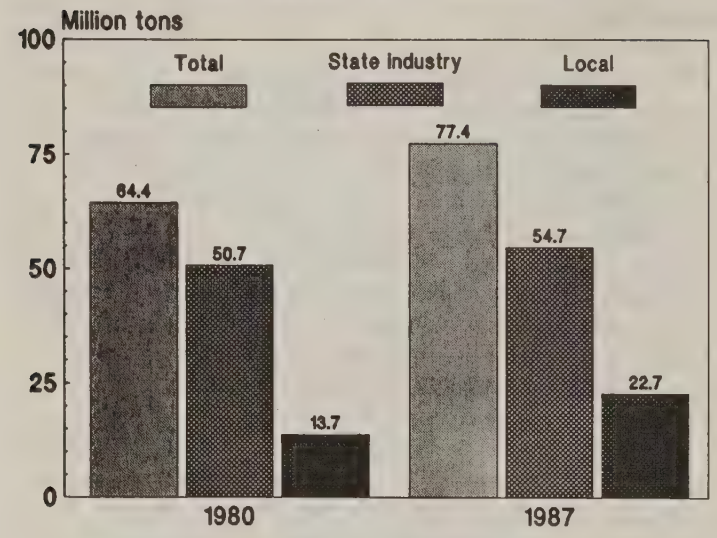
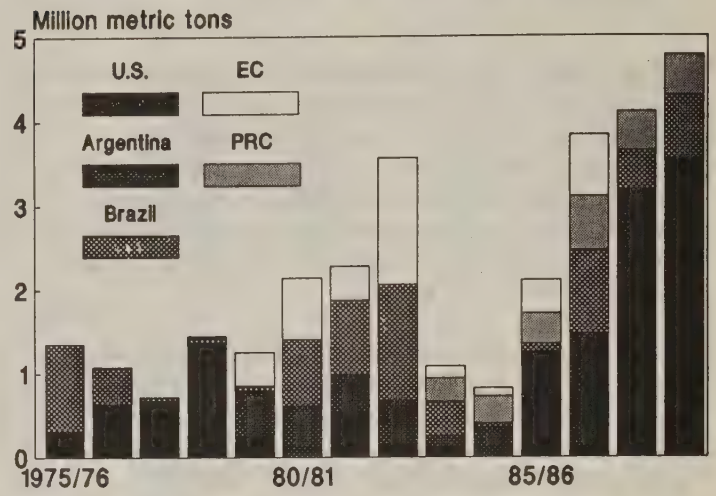


Figure 29

USSR Soybean and Soybean Meal Imports•



•Soybean meal equivalent; estimates for October-September.

Soy Imports

Combined Soviet imports of soybeans and soybean meal (in soybean meal equivalent) in October 1988/September 1989 should exceed the record set the previous year (figure 29). The Soviets' main motive in expanding imports of soy products is the desire to continue increasing the protein content of mixed feeds, a key component of boosting feeding efficiency and meat production. Consequently, demand for soybean and soybean meal imports should remain strong in 1989/90.

Although Soviet soybean purchases could fall moderately in 1988/89, soybean meal imports should increase substantially. In calendar 1988, the USSR also purchased 1.42 million tons of tapioca from Thailand, and they continued purchases into 1989.[128] The low-protein tapioca, which requires even more protein supplement than grain, is mixed with soybean meal (mainly from the United States) for use as livestock feed.

The United States should retain a large share of Soviet soy imports, although the share may be down from 1987/88 (table 43). Major reasons behind the surge in U.S. exports of both soybeans and soybean meal in 1987/88 were the depreciation of the dollar and improved U.S.-Soviet political relations. The large purchases in late 1988, however, brought some confusion, as the Soviets in December contracted for, cancelled, and then reordered 431,000 tons of soy products (in soybean equivalent).

Soviet soybean imports in 1988/89 might fall slightly (figure 30). The U.S. share of USSR soybean imports increased dramatically in 1987/88, from 5 to about 57 percent. The United States gained mainly at the expense of Argentina, which fell from two-fifths of the Soviet

[128]*Bangkok Post*, 1/4/89.

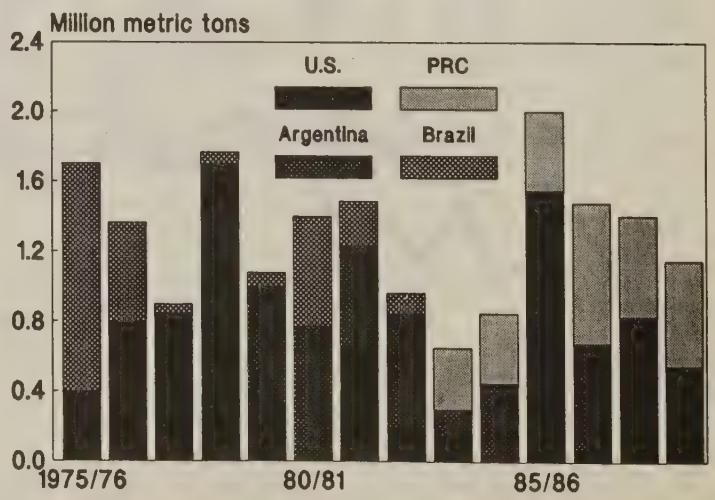
Table 43--U.S. soybean and soybean meal exports to the USSR 1/

Year	Soybeans	Soybean meal 2/
	1,000 tons	
1976/77	839	--
1977/78	805	--
1978/79	1,187	27
1979/80	807	--
1980/81	--	--
1981/82	710	--
1982/83	199	--
1983/84	416	--
1984/85	--	--
1985/86	1,519	--
1986/87	68	--
1987/88	831	1,320
1988/89 3/	450	1,375

1/ October-September marketing year. 2/ To convert to soybean equivalent, divide by 0.795. 3/ As of May 9, 1989.
Source: U.S. Export Sales.

Figure 30

USSR Soybean Imports•



•Estimates for October-September.

market in 1986/87 to only about 2 percent. The U.S. share, though, could drop slightly in 1988/89, as that of Argentina rises (from its small base). The PRC's significant share--about 40 percent in 1987/88--may change little, and India will probably become a minor supplier. India had a good crop in 1988, and soybean exports will help reduce the country's trade deficit with the USSR.

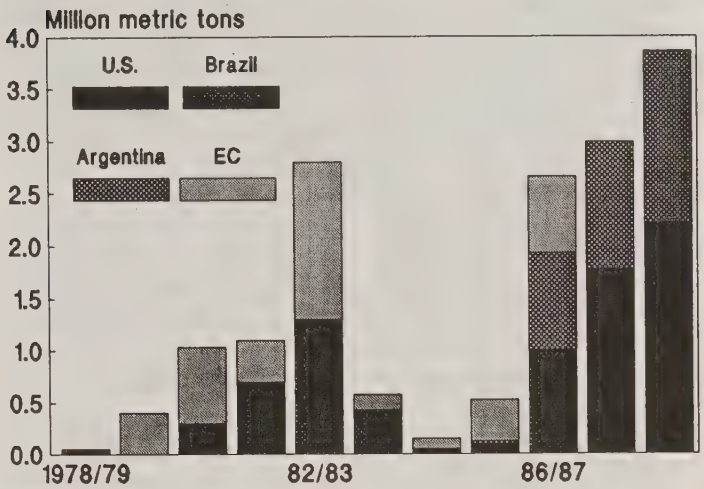
Imports of soybean meal should increase significantly in 1988/89, perhaps more than 30 percent over 1987/88's record (figure 31). Imports during October 1988-March 1989 were estimated nearly 75 percent higher than during the corresponding period in 1987/88. During this time the Soviets imported over 1.3 million tons from Argentina and almost 800 tons from the United States. In 1987/88, the United States went from selling no soybean meal to the USSR to supplying over two-fifths of the market. Argentina's share also rose, while that of Brazil, West Germany, and the Netherlands fell significantly. West German and Dutch meal exported to the USSR is produced by crushing soybeans purchased mainly from the United States. Thus, from the point of view of the United States, the 725-ton fall in West German and Dutch soybean meal exports to the Soviets in 1987/88 offset much of the rise in U.S. soybean exports to the USSR.

Primarily because of the droughts in North and South America in 1988, import prices of Soviet soybeans and soybean meal have risen. In calendar 1988 unit values of Soviet imports of soybeans and meal were an estimated $260 and $245 a ton, respectively, compared with corresponding values of $197 and $170 in 1987. Prices during marketing year 1988/89 are predicted to be higher than during calendar 1988.

Although U.S. soybean meal exports to the USSR should increase in 1988/89, market share will probably fall as the Latin American share rises. Soy products from Brazil and Argentina have been judged superior in quality to U.S. output this year. Also, in Soviet eyes, meal from Latin America continues to have an advantage vis-a-vis U.S. meal because it is pelletized (which makes for easier handling and less spoilage). Argentina's share

Figure 31

USSR Soybean Meal Imports*



*Estimates for October-September.

in meal exports to the USSR could grow further in future years. Argentina's wish to produce more soybeans and less coarse grain dovetails with the Soviets' desire to import more high-protein feeds and less corn. In 1988/89, though, among the major suppliers, Brazil should enjoy the largest rise in meal market share, partly because its soybean meal achieved a higher protein content than that of its competitors.

Soviet vegetable oil imports should grow modestly in 1988/89, despite a rise in domestic production and imports of oilseeds. This is because oil imports fell by about a quarter in 1987/88, due to increased production and imports of oilseeds in 1987 and large vegetable oil imports in 1986/87. Soviet leaders' desire to bolster support for the economic reform movement by increasing food consumption should keep future imports relatively high. The structure of vegetable oil imports has remained consistent over the last few years--primarily soybean oil from Argentina and Brazil, sunflowerseed oil from Argentina, and palm oil from Malaysia. The U.S. sale of soybean oil to the USSR in 1984/85 remains the most recent trade involving vegetable oil between the two countries. *(William M. Liefert)*

Economic Reform and Soviet Grain Imports

The conventional wisdom is that successful reform of Soviet agriculture would reduce imports of grain and other agricultural goods. Reform would increase agricultural productivity, and the ensuing additional output would decrease the need for imports. This article qualifies the conventional wisdom by presenting empirically estimated results that indicate the USSR, in the present and perhaps also the future, might benefit from increasing grain imports. The article does not argue that when all factors are considered, increased grain imports are likely. Rather, it argues that an economic basis for increased imports might exist, and that reform could strengthen incentives to capture more of the potential gains from trade by expanding grain imports.

The improvement in productivity that agricultural reform could bring can be identified as an increase in technical, or X-, efficiency. Reform, though, could also improve economic, or allocative, efficiency. This would raise

output not by increasing input productivity within industries, but by better allocating inputs between industries, with a concomitant change in the mix of goods domestically produced and traded. With respect to trade, increases in allocative efficiency result from trade more closely following comparative advantage. (A country trades according to comparative advantage by exporting goods it can produce relatively inexpensively, and thus have a comparative advantage in, and by importing products relatively costly to produce, in which it has a comparative disadvantage.) Assume that at present the USSR has a major comparative disadvantage in grain. Even if reform then raises technical efficiency in grain production, an increase in grain imports might still be rational on the grounds of allocative efficiency.

The specific empirical question examined is whether, from the point of view of trade according to comparative advantage, the Soviets have benefited more from imports of grain or machinery and equipment (M&E) from the West (the OECD countries).[129] Although the empirical results undoubtedly suffer from a fair degree of inaccuracy, they indicate that grain has been a more profitable import than M&E. Thus, the Soviets would apparently increase their total gain from trade with the West, and thereby improve allocative efficiency, if they imported less M&E and more grain.

Two conditions must hold, though, for an economically reformed Soviet Union to expand grain imports. First, increases in agricultural productivity, as well as changes in domestic input and trade prices, cannot be such that Soviet comparative disadvantage in grain is substantially reduced. Second, economic decisionmaking must be altered such that trade more naturally follows the lines of comparative advantage. Among other things, this necessitates that political relations between the USSR and the West improve sufficiently such that the Soviets abandon the goal of agricultural autarky for security reasons, which does not seem likely. Reform, though, should make more apparent the tradeoffs, and thus increase the conflict, between economic and political concerns in Soviet foreign trade decisionmaking.

Method of Analyzing Soviet Comparative (Dis)Advantage in Grain versus M&E

Since 1970 grain and M&E have comprised about half the value of Soviet imports from the developed West. The Soviets no doubt have a number of economic reasons for importing both types of products, such as the need to cover unexpected shortfalls in domestic production. Economic theory posits, though, that the main economic motive for countries to trade should be the desire to gain from trade according to comparative advantage, and thereby increase allocative efficiency. The method used for analyzing Soviet comparative disadvantage in grain and M&E is to compute and compare "import cost ratios" for the two product groups. The import cost ratios (calculated annually) equal: (1) the full potential cost to the Soviets, in domestic rubles, of domestically producing all units of a good imported, divided by (2) the total dollar value of imports of the good. These ratios identify the gross number of rubles of resources the Soviets "save" by importing the goods, rather than producing them, for each dollar spent on the imports.

For example, assume that the import cost ratios for grain and M&E in a given year equal 3 and 2, respectively. A dollar spent on imported grain saved the Soviets 3 rubles of resources, because had the Soviets produced another dollar's worth of grain domestically, rather than importing it, production would have cost 3 rubles. A dollar spent on grain is more profitable, by one ruble, than a dollar spent on M&E.

Grain production, however, involves increasing marginal cost. Consequently, one can estimate the Soviets' specific resource saving from grain imports only at the margin, that is, for the last unit of grain imported. Estimation of the "average" resource saving for all grain imports is not feasible. Therefore, the marginal, as opposed to average, cost of grain production must be used in determining the numerator of the import cost ratios for grain. The method of estimating the Soviet marginal cost of grain production rests on the assumption that national marginal cost equals average cost in the highest average cost republic in the country (with some adjustments).

Estimating the potential cost to the Soviets of domestically producing M&E imported from the West is particularly challenging. Thus, a range of estimates is computed. With the use of data and procedures provided by Treml and Kostinsky (1982),[130] a cost estimate is made for 1972. Values for other years are then obtained by adjusting for changes in domestic production cost.

Results

The results indicate that the Soviets have had a greater comparative disadvantage in grain than M&E (table 44). In almost all years, the import cost ratio for grain is

[129]The methodology is described in more detail in Liefert, William M., "The Soviet Gain from Trade with the West in Fuel, Grain, and Machinery," unpublished manuscript (1988) and Liefert, William M., "The Marginal Cost of Soviet Crop Production," CPE Agriculture Report (September/October 1988).

[130]Vladimir G. Treml and Barry Kostinsky, Domestic Value of Soviet Foreign Trade: Exports and Imports in the 1972 Input-Output Table, U.S. Dept. of Commerce, Bureau of the Census, Foreign Economic Report No. 20 (Washington, DC: U.S. Government Printing Office, 1982).

Table 44--Import cost ratios for Soviet grain and machinery and equipment imports from West

Year	Grain	Machinery and equipment 1/		
		Downward estimate	Intermediate estimate	Upward estimate
1970	1.39	0.84	1.06	1.59
1971	1.34	0.87	1.10	1.66
1972	1.43	0.76	0.96	1.44
1973	1.31	0.58	0.73	1.10
1974	0.95	0.53	0.67	1.01
1975	0.56	0.45	0.57	0.86
1976	0.70	0.46	0.58	0.87
1977	0.79	0.40	0.51	0.76
1978	1.06	0.33	0.42	0.63
1979	0.92	0.30	0.38	0.57
1980	0.81	0.28	0.36	0.54
1981	0.79	0.33	0.41	0.62
1982	0.85	0.35	0.44	0.66
1983	0.86	0.36	0.46	0.69
1984	0.92	0.40	0.51	0.76
1985	1.06	0.41	0.52	0.78
1986	1.38	0.32	0.40	0.60
1987	1.88	0.26	0.33	0.50

1/Based on downward, intermediate, and upward estimates of potential cost to Soviets of domestically producing machinery and equipment.
Sources: Dollar values of Soviet imports of grain and M&E used to determine denominators of import cost ratios from Vneshnyaya torgovlya. Cost values in numerators of ratios are author's estimates.

much greater than the intermediate estimate of the ratio for M&E, and in all years after 1977 is higher than the upward estimate also. The results imply that had the Soviets imported more grain and less M&E from the West, their total (resource) gain from trade would have increased.

The import cost ratio for grain rises so substantially in 1986 and 1987 because of the large fall in grain import prices, thereby making imported grain even more attractive. The price increase in 1988, and further expected rise in 1989, though, should reduce the ratio to levels closer to those in 1980-85.

As mentioned before, if perestroika succeeds in raising agricultural productivity and output, one might expect Soviet imports of grain and other agricultural goods initially to fall. Not only would increased domestic output reduce the need for imports, but higher productivity would lower production costs, and thereby diminish Soviet comparative disadvantage in agriculture.

Yet, even if reform increases agricultural productivity, the Soviets' comparative disadvantage in grain might remain sufficiently large that a rise in grain imports would be economically rational. Might the Soviets then, as an outcome of reform, expand grain imports? The following is an argument as to why successful perestroika, particularly if across the entire economy, could in the long term lead the Soviets in that direction.

Assume that grain import prices rise to the general level during 1980-85, and no major changes subsequently occur in domestic input and trade prices. The only way the import cost ratio for grain could then drop to that of M&E would be if productivity increases lowered production costs. Grain production cost would have to fall by at least one quarter. This would require a minimum 33-percent increase in productivity (because 4/3, the new productivity index, is the inverse of 3/4, the new cost index). If future grain import prices were to remain at the relatively low levels of 1986-87, the domestic production cost for grain would have to fall by a much greater amount for the import cost ratio for grain to drop to that for M&E.

This assumes, though, that successful reform does not increase productivity, and thus reduce cost, in industry. If it did, the import cost ratio for M&E would also fall. At an extreme, if productivity were to increase in the entire economy by the same percentage, all real (relative) costs would not change. The Soviets' greater comparative disadvantage in grain vis-a-vis M&E or any other products would be unaltered, because comparative (dis)advantage depends on relative costs and prices. Thus, even if agricultural reform substantially increased productivity, the Soviets might still have a sufficiently large comparative disadvantage in grain such that an increase in grain imports would be economically prudent. (Or in other words, increases in technical efficiency might not be great enough to invalidate additional grain imports for reasons of allocative efficiency.)

Major increases in agricultural productivity are unlikely without decentralization of decisionmaking, greater use of market incentives, and price reform. The Soviets are still uncertain as to the extent to which they should decentralize foreign trade decisionmaking and thereby integrate the country into the world economy. They could eventually conclude, though, that a market-driven, decentralized domestic economy cannot thrive without decentralized and predominantly free trade with currency convertibility. Thus, the institutional and incentive changes that raised productivity would also encourage trade expansion. In such a system trade would generally follow the lines of comparative advantage. If the USSR then continues to have a major comparative disadvantage in grain, whether because of intractable inefficiency or unfavorable natural conditions, the economy's more decentralized nature will inherently create greater pressure to expand grain imports.

Growth in agricultural imports would demand that trade not be heavily controlled for political or security reasons, which would require a major shift in Soviet attitudes. Because such a change seems less likely than successful economic reform, and because of other conditions necessary, the probability the Soviets will increase grain imports for reasons of comparative (dis)advantage in the short to medium term is not high. If trade policy remains unchanged, the Soviets will continue to suffer the opportunity cost of falling far short of their economically optimal level of trade. *(William M. Liefert)*

USSR Agriculture by the 21st Century

Basic USSR socioeconomic goals and the structure of its institutions to support those goals have shaped Soviet agriculture and agricultural trade policies and programs. The goals traditionally included a high level of national self-sufficiency, relatively low and stable prices for basic goods, and stable and sustainable growth of consumer goods of lesser priority than defense and capital sectors. A centrally planned and managed economy, administratively set producer and consumer prices, and Government-controlled foreign trade were to support these goals. Soviet leadership, although still committed to a socialist political-economy, is changing the emphasis within the goals and making institutional changes to accommodate the shifts in emphasis. These changes may reduce Soviet agricultural imports, including grain and oilseed imports.

Food Self-Sufficiency

Large oil and gold price increases coupled with higher export volumes (and larger arms sales) raised Soviet hard currency earnings 10-fold from 1973 to 1983, to over $32 billion. The Soviets retreated somewhat from their goal of food self-sufficiency, using part of this windfall to increase agricultural imports. The imports helped shelter consumers from the effects of erratic domestic farm production and the stagnation in the agricultural sector that became acute in the late 1970's and early 1980's.

Agricultural imports averaged $2.6 billion annually in 1970-72, but almost $19 billion in 1981-85. Annual grain imports increased 14 times from 1970-72 to 1981-85, to almost $7 billion. Hard currency grain imports also rose 14 times, averaging almost $6 billion annually during 1981-85. The United States captured a large share of the agricultural import growth. U.S. agricultural exports to the USSR totaled $25 billion in 1972-88, of which 95 percent was grain and oilseeds.

The USSR's current rhetoric concerning its renewed appreciation of the "Leninist principles" of the international division of labor does not extend to settling for lower domestic self-sufficiency in food. The commitment to self-sufficiency is illustrated by General Secretary Gorbachev's announcement of the 1995 grain production goal of 260-280 million tons, 50 percent higher than average annual production in 1981-85, when grain imports averaged 40 million tons a year (figures 32 and 33). Moreover, Gorbachev noted: "Without increasing grain production it is impossible to resolve the task of ensuring the country's self-sufficiency in feeds and reducing imports."[131]

[131] *Sel'skaya zhizn'*, 3/24/88, p. 1, translated in FBIS-SOV-88-057, 2/24/88, p. 74.

Figure 32

Soviet Grain Production

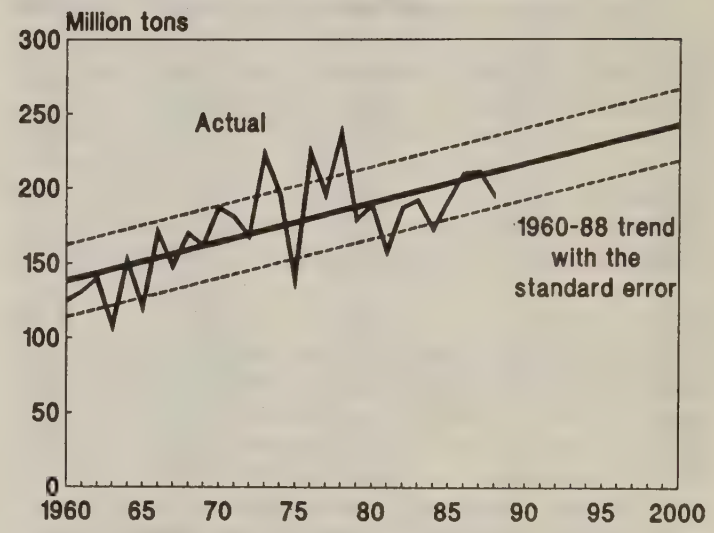
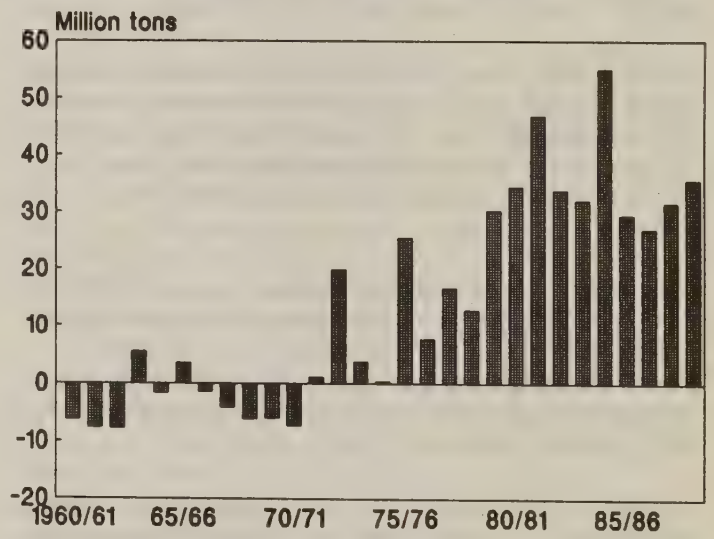


Figure 33

Soviet Net Grain Imports



Soviet economists now recommend stopping the subsidized sales of imported grain to farms in order to help decrease the massive budget deficit. The trade reform initiated in 1986, while relaxing central control for some goods, left about 80 percent of trade still under central control, including that of grains, oilseeds, meat and dairy products, and fuels.

Gorbachev stated that agricultural imports were reduced in the second half of the 1980's because of lower hard currency earnings. Improved agricultural production and generally lower grain prices facilitated the cuts. Agricultural imports in 1986-88 averaged less than $16 billion per year. Hard currency grain imports averaged about $3 billion annually.

Farm Policies and Programs

The Soviets cannot rely on an extensive pattern of growth to increase agricultural output. No "new lands" await the plow, and massive irrigation programs have resulted in major ecological problems. The Soviets are focusing on four points to improve agricultural production and productivity and consumer food supplies: (1) upgrading farming practices (the IT program and improved research and extension); (2) improving management and worker incentives by decentralizing management and financial responsibilities and increasing competition; (3) enhancing rural infrastructure from roads to housing to medicine; and (4) improving storage, processing, and marketing.

These same goals were addressed under the 1982 food program, with some success. Grain production in 1986-88 averaged 206 million tons annually, versus 1981-85's 180 million tons. The greater output helped raise per capita consumption of meat from 57 kilograms in 1982 to 65 kilograms in 1988 (figure 34). Still, grain imports in 1986-88 averaged over 30 million tons per year and feed protein imports were at record levels.

As the original food program has evolved, the national leadership has begun to give farms, local areas, and republics more flexibility in developing and adapting programs to meet these goals. The Government's throwing money at agriculture has not changed, although officials are relying less on gigantic programs such as the Siberian rivers diversion and more on better use of existing resources. For example, the plan to shift a greater share of agricultural investment into processing and distribution should cut the field-to-table losses now estimated at 25 percent and higher. Additionally, agriculture may benefit as the defense and heavy industries--which have higher priority and better equipment--start producing agricultural inputs and processing facilities.

Whenever change occurs, those with a vested interest in the status quo--from excess administrators to lax workers--will resist. More damaging to reforms, the Government vacillates on the scope, pace, and details of restructuring, and the reform provisions are inconsistent and incomplete. Major contradictions concern the price formation process and equity versus efficiency considerations.

The reform of the price formation process, which was to be concluded by 1991, has been postponed. The system of administered prices, not tied to world prices, does not provide an accurate basis for decisions about production efficiency. Because of low retail prices and rising costs of production, processing, and distribution, State subsidies of 88 billion rubles ($145 billion) have been allocated in 1989 to cover the differences between Government purchase prices for agricultural commodities and retail prices for food.[132] These subsidies represent 19 percent of Government budgetary expenditures and contribute to the large budget deficit. The low retail prices and continual increase in incomes have led to massive shortages and hidden and open inflation, which is now threatening Soviet economic security (figure 35).

The Soviets, unable to face up fully to income disparities, equivocate on their reliance on financial incentives and market allocation. This ambivalence raises the perception of risk for innovative workers and managers. The first deputy chairman of the USSR Council of Ministers' Bureau on Social Development says, "Unfortunately, at many cooperatives it is precisely this motivation--profit--that prevails."[133] Officials are

[132]Report by the USSR Minister of Finance to USSR Supreme Soviet, *Pravda*, 10/28/88, pp. 4-5, translated in FBIS-SOV-88-209, 10/28/88, pp. 56-57.

[133]*Pravda*, 2/18/89, p. 3, translated in FBIS-SOV-89-039, 3/1/89, p. 82.

Figure 34

Soviet Meat Consumption

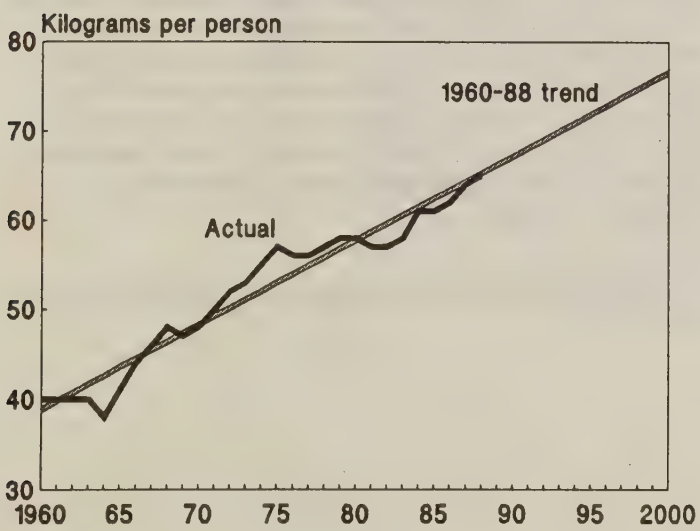
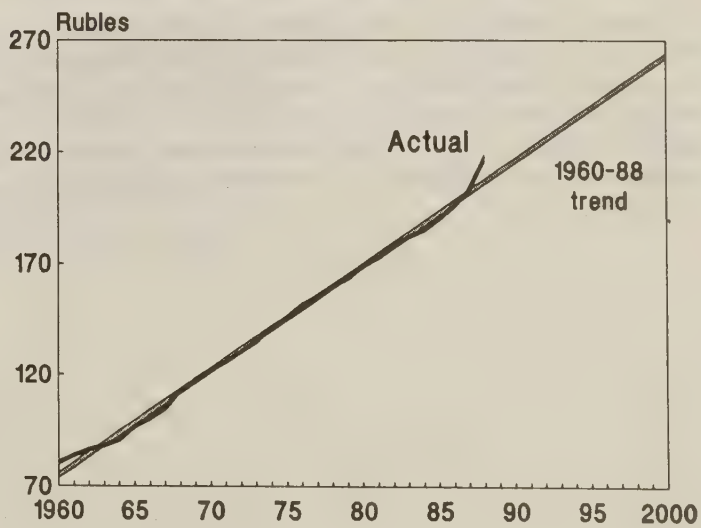


Figure 35

Soviet Average Monthly Wage



repeatedly stepping in with administrative measures rather than allowing competition to squeeze out monopoly profits. The restrictive norms regarding wages and other farm and enterprise funding make it difficult to reward initiative and hard work. Lack of consumer goods on which to spend income further lessens willingness to take risk.

Prospects

The reforms underway, while doing little to affect the demand for food, should improve agricultural production and productivity and food supplies. The need for agricultural imports could decline from current levels. But, rectifying the inconsistencies will take time; thus, the potential of Soviet agricultural resources likely will remain unrealized as the USSR enters the 21st century. This is the reasoning behind the following forecasts about the grain-livestock sector, which are key to U.S. farm interests.

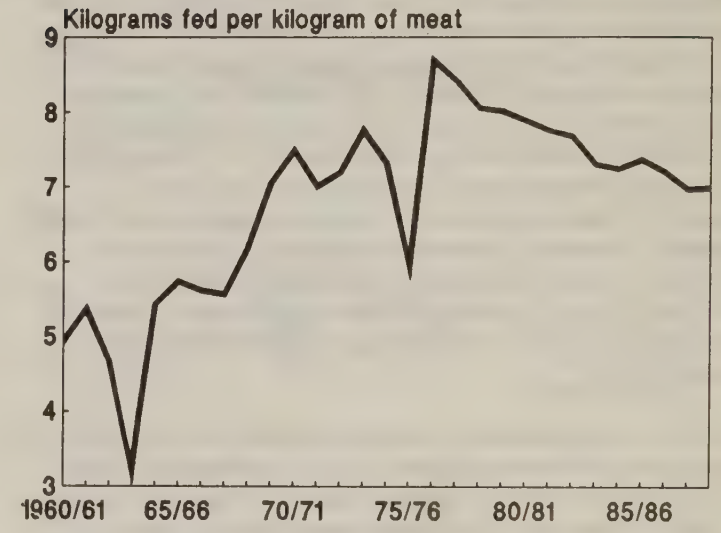
The decline in grain area which occurred during the 1980's should end, since the planned increase in fallow has occurred. The need to maintain rotation cycles, plus continued interest in roughages, oilseeds, and other crops, will hold down expansion of grain area. Yield increases reflecting better quality inputs and the improved management and incentive structure may set yields near the 1960-88 trend line. Grain production could reach 240 million tons by 2000, a substantial increase over 1986-88's 206-million-ton average, but well below the Soviet goal of 260-280 million tons in 1995. Wheat quality should be up.

Western and Soviet analysts agree that easing the chronic feed protein shortage, estimated currently at 10-15 million tons in soybean meal equivalent, is necessary to raise Soviet animal productivity, improve feeding efficiency, and increase animal product output. Total oilseed area may rise. Combined with yield increases, oilseed production may exceed 15 million tons by the year 2000, up from 1986-88's 11-12 million tons annually.

The increase would still leave a sizable protein deficit, which a more rational Soviet feeding policy would seek to narrow with higher imports. A 50-percent increase from 1988 protein feed imports, added to the greater domestic supplies, could be a major factor in improving feeding performance and mitigating grain-for-feed requirements (figure 36).

Figure 36

Soviet Grain Fed Coefficient



More and better grain production and higher feed protein supplies would allow the Soviets to increase animal product output and per capita meat consumption, with grain imports perhaps a third below the 1986-88 annual average of 31 million tons. Higher domestic supplies of milling quality wheat would mean that wheat imports would decline proportionately more than coarse grain imports.

If Soviet leadership were quick to adopt truly radical reforms (such as ending control of pricing, resource allocation, production, and trade), despite some short-term disruption, the USSR could improve its domestic agricultural production and productivity even more. Such improvement could even reverse Soviet import dependence for some commodities, perhaps realizing Soviet hopes to stop grain imports by 2010.[134] However, a more prosperous economy, more receptive to trade, should have the potential for absorbing more food and other consumer imports.

Failure to deal with the contradictions inherent in current Soviet reform policies and programs will not only limit the positive results, but could cause the Soviets to back away from the reforms. Such an outcome would lead to stagnation in agricultural production and productivity and exacerbate the need for food imports. How a bankrupt economy would finance such imports is problematic. *(Kathryn Zeimetz)*

[134]*Izvestiya*, 2/1/89, p. 5, translated in FBIS-SOV-89-022, 2/3/89, p. 72.

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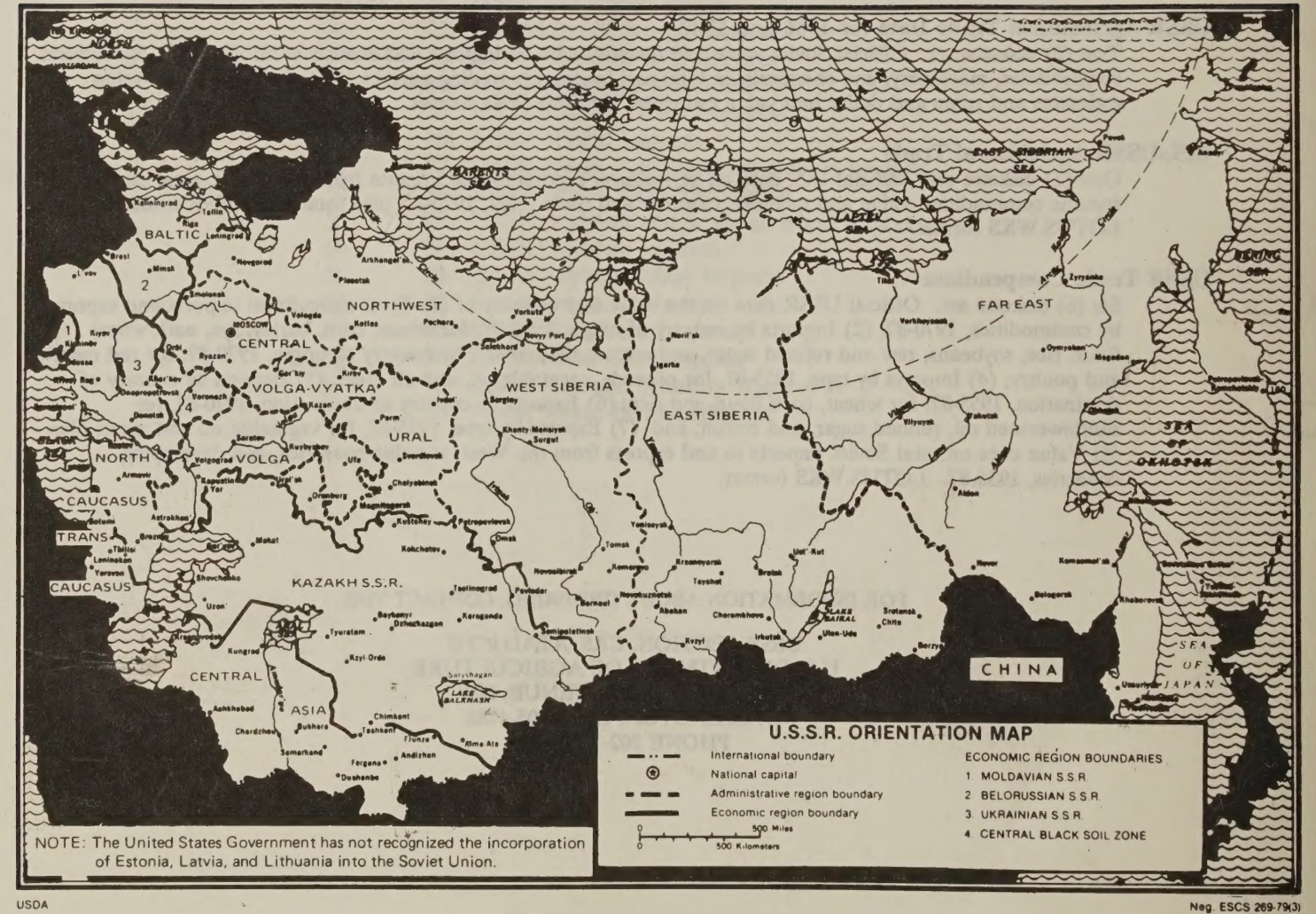

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